

The University of Chicago

EFFECT OF STUDENT TEACHING ON
SECONDARY-SCHOOL PUPILS IN
ACHIEVEMENT AND ATTITUDE

A PART OF A DISSERTATION SUBMITTED TO THE FACULTY OF
THE DIVISION OF THE SOCIAL SCIENCES IN CANDIDACY FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF EDUCATION
1943

By

RAYMOND ROBERT RYDER

Reprint of
THE PURDUE UNIVERSITY DIVISION OF EDUCATIONAL
REFERENCE STUDIES IN HIGHER EDUCATION LI
Further Studies in Attitudes, Series VIII
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CHAPTER I

INTRODUCTION

The history of supervised student or practice teaching as a requirement in the preparation of teachers for secondary schools contains some interesting facts.¹ One of the most interesting is that it developed simultaneously with the scientific movement in education. Both movements began at about the same time, both have flourished in the forty years since the time of their origin, both have enjoyed the confidence of the supporting public, and both in recent years have turned the light of self-evaluation and self-criticism upon their achievement. Here the parallelism seems to end, for the supervisors of student teaching have been more concerned with developing the art of teaching than with applying the techniques of science. Measuring the effects of their work, either upon the pupils taught or upon the student teachers themselves, has not in general been a matter of major concern.

The year 1907 is a significant date in the history of both movements. It may be said to mark the origin of both the scientific movement in education and state-licensing regulations requiring prospective high-school teachers to take a course in supervised student teaching. Thus, Reavis makes the following unequivocal statement: "The use of statistical investigations in educational administration began around 1907."² In regard to the contribution of the objective movement to secondary education Reavis continues as follows:

The development of the measuring movement and the perfection of tests for the measurement of achievement and mental capacity have made possible great advances in educational administration. Between 1900 and 1910 problems in administration, such as the classification of pupils, the appraisal of pupil progress, the diagnosis of disabilities in learning, the identification of special aptitude, the promotion of pupils, and the appraisal of the relative effectiveness of different types of curriculum material could not be studied objectively and scientifically by administrative officers.

¹ The term *supervised student teaching* was adopted by the Directors of Student Teaching at their first meeting in Cleveland (1920) to replace the older term *practice teaching*. (See Arthur Raymond Mead, *Supervised Student Teaching*, p. 142. Richmond: Johnson Publishing Co., 1930.)

² William Claude Reavis, "Contributions of Research to Educational Administration," *The Scientific Movement in Education*, p. 25. The Thirty-seventh Yearbook of the National Society for the Study of Education, Part II. Bloomington, Ill.: Public School Publishing Co., 1938.

Now, objective tests are used extensively in the general appraisal of the mental status and school achievement of pupils as a basis for the solutions of problems pertaining to the curriculum and the adjustment of the pupil personnel.³

In 1907 the National Education Association received a report from a committee it had appointed—the Committee of Seventeen on the Professional Preparation of High-School Teachers. The investigation made showed that practice teaching was in the process of being introduced as a credit-bearing course in colleges and universities. The member of the committee charged with the duty of investigating the training of teachers for secondary schools says: "It is truer than many of us would wish to recognize that it is as yet largely on paper."⁴ The smaller liberal arts colleges did not offer the course although they were in other respects, like the universities, offering professional courses of a theoretical type for those who expected to become high-school teachers. Even at that time in most of the states prospective teachers had to meet licensing requirements that prescribed credit in certain courses in psychology and in the history and principles of education. No state department of education required for high-school teachers a course in practice teaching before 1906. In 1907 California was the only state that required such a course for a secondary-school certificate. The law that was the basis of this requirement went into effect in June, 1906.⁵

The normal schools at that time were debating the issue of whether they should attempt to train teachers for the high schools rapidly increasing in number throughout the country.⁶ In this vigorous controversy the opponents of the view that normal schools should assume this function were strengthened greatly by the opinions of important leaders in secondary and higher education. Among these were President G. Stanley Hall, who said, "I think preparation of secondary teachers should never be permitted in a normal school where primary teachers are trained, but should be entirely given over

³ *Ibid.*, p. 27.

⁴ Edwin G. Dexter, "The Present Training of Teachers for the Secondary Schools," "Papers on the Professional Preparation of High-School Teachers, XVI," p. 648. *Addresses and Proceedings of the National Education Association, Los Angeles, Cal., July, 1907.* Washington: National Education Association, 1907.

⁵ *Ibid.*, p. 648.

⁶ For the argument favoring the normal schools' assuming of this function, see John R. Kirk, President of State Normal School, Kirksville, Mo., "Papers on the Professional Preparation of High-School Teachers," pp. 661-668. *Addresses and Proceedings of the National Education Association, Los Angeles, Cal., July, 1907.* For the opposing view see the address by John W. Cook, President of the Northern Illinois State Normal School, *ibid.*, 628-638.

to the university." Professor Charles DeGarmo was opposed to the normal schools' attempting to train teachers for high-school positions, as was also President Thompson of Ohio State University and other college presidents. Among the latter was President Babcock of Arizona, who had had long experience in various capacities with the Minnesota and California systems of education. The attitude of the liberal arts colleges and universities was well summarized by him in the following statement:

If the normal schools are going to train their students for grade-work frankly, honestly, without any pretension or conceit, those who desire to go on for high-school work must go to the university, to the colleges or teachers' colleges, which provide that sort of training.⁷

Of 148 colleges and universities whose catalogues were examined by the committee of the National Education Association mentioned above, only 36, or but little more than one-fourth, offered courses in observation and practice teaching. The committee made significant comment that it was uncertain that much actual practice teaching was done in those colleges and universities. The description given in the catalogue of Dartmouth College, for example, reads as follows:

The Professor of Education and the graduate students in Education spend one week each year visiting the high schools of Boston. Students are also urged to visit the local high schools.⁸

At the University of Chicago in 1907, supervised student teaching was required only in certain courses in mathematics. "However," continues the report, "no information could be obtained as to where or how the work is done."⁹

In 1907 many of the larger universities did not offer the course at all. Among these were Indiana University, Purdue University, Ohio State University, the University of Iowa, and the University of Texas. Comparison of this situation with that of today reveals remarkable progress. A recent study has shown that, in one hundred selected colleges and universities offering professional courses for secondary-school teachers, supervised student teaching is the only education course required in all.¹⁰

⁷ Frederick E. Bolton, "Requirements and Standards," "Papers on the Professional Preparation of High-School Teachers," pp. 612-613. *Addresses and Proceedings of the National Education Association, Los Angeles, Cal., July, 1907*. Washington: National Education Association, 1907.

⁸ Dexter, *op. cit.*, p. 650.

⁹ *Ibid.*, p. 651.

¹⁰ Marion J. S. Blaha, "Study of the Requirements for the Professional Training and Certificating of Secondary-School Teachers in One Hundred Selected Universities and Colleges and Forty-eight State Departments of Education," Doctor's Dissertation, University of Washington, 1941.

Gradually at first, and then very rapidly since 1930, the various state departments of education have passed regulations requiring supervised student teaching for high-school teachers. Brownell reports that in 1925 fourteen states had this requirement for a high-school certificate.¹¹ Mead says that in 1930 twenty-two states had the requirement, but for the country as a whole "50 per cent of beginning teachers or more do not have such preparation."¹² In 1939 thirty-six states and the District of Columbia required supervised student teaching for a high-school certificate; and in three additional states the course was optional. One of these (Illinois) required it for junior-high teachers; and another (Idaho), while not requiring it, recommended that all take it. The third (North Carolina) required it for Class A certificates.¹³

In 1942 the number of states requiring supervised student teaching had increased to 40. The District of Columbia required it,¹⁴ and three of the eight states not requiring it recommend the course as desirable.

LACK OF APPLICATION OF THE MEASUREMENT MOVEMENT TO THE AREA OF SUPERVISED STUDENT TEACHING

Despite the fact that supervised student teaching as a form of professional education for high-school teachers has found increasing favor with school authorities, its effectiveness has been determined on the basis of personal judgment rather than on quantitative measurement. This statement is particularly true in respect to the effectiveness of the teaching done by the student while he is gaining experience through practice. The means of obtaining quantitative measurements have been at hand through the simultaneous growth in number and refinement of objective tests and measurements at the secondary-school level, but they have not been applied as comprehensively or as thoroughly as one would expect.

Library research for published reports on the achievement of secondary-school pupils when taught by supervised student teachers reveals several interesting facts. The first is that this important phase of teacher education has not been investigated recently; the second is that relatively few studies have been made, even if the

¹¹ W. A. Brownell, "State Requirements for High-School Teachers," *School Review*, XXXIV (April, 1926), 295-299.

¹² Mead, *op. cit.*, p. 140.

¹³ Robert C. Woellner and M. Aurilla Wood, *Requirements for Certification of Teachers and Administrators for Elementary Schools, Secondary Schools, Junior Colleges*. Chicago: University of Chicago Press, 1939 Edition.

¹⁴ *Ibid.*, 1942 edition.

elementary field is included ; and the third is that the topic has never been investigated thoroughly under rigidly controlled experimental conditions. The evidence thus far submitted has been somewhat contradictory, because perhaps of the fact that it was obtained from different methods of approach and under conditions not always conducive to scientific accuracy. A fair conclusion, from the investigations already made, is that up to the present the evidence submitted that supervised student teaching has been either beneficial or harmful to high-school pupils has been fragmentary and unconvincing.

QUANTITATIVE STUDIES NEEDED

It was discovered in the course of the present investigation that nearly every published report dealing with the problem contains statements that declare the desirability, even the necessity, for measuring the results obtained when pupils are taught by practice teachers. A few quotations illustrating this point are here presented :

I have heard a number of citizens of Greeley express the firm conviction that the child who attended the training school of the Colorado State Teachers College learned very much less than the child who attended a school in which there were no student teachers to practice on their children. They had no evidence for their belief and I had no evidence to contradict it.¹⁵

In one of the most comprehensive and penetrating surveys of teacher education ever made, this statement is found :

The supervision of teaching—whether practice teaching or “regular” teaching—cannot proceed effectively unless an intelligent effort is made to check the results of the teachers’ work as measured by the growth of the pupils. . . . The efforts to improve practice teaching then are not to be limited to the criticisms and suggestions which the supervisor makes to the student after his visits to the practice class. Indispensable though they are, these cannot tell the whole story. . . . In all effective supervision, therefore, the efforts of the supervisor must be supplemented by objective tests that will determine the growth that the pupils have made under the teachers’ direction.¹⁶

In one of the earliest investigations of the problem, Gray states succinctly the importance of measurement in this area :

The purpose of this investigation was to determine the efficiency of pupils who had been taught by student teachers as

¹⁵ J. D. Heilman, “The Child’s Loss Due to Student Teaching,” *School and Society*, XXI (March, 1925), 296-297.

¹⁶ W. S. Learned, W. C. Bagley, and others, *The Professional Preparation of Teachers for American Public Schools*, Bulletin No. 14, p. 219. New York: The Carnegie Foundation for the Advancement of Teaching, 1920.

compared with the efficiency of public school pupils. The question is an important one because the efficiency of instruction in training schools is seriously questioned in many centers where practice teaching facilities are desired.¹⁷

The importance of measuring the results of supervised student teaching is as true today as it was twenty-five years ago. It is even more important because of the fact that many secondary-school teachers now receive their training in public high schools under a plan generally known as a co-operative arrangement between the college or university on the one hand and the local school board on the other. The chief difficulty involved in this plan is well stated, as follows:

One of the paramount issues involved in any co-operative plan of student teaching operated by a teacher training institution in conjunction with the public school system is, "Does the student teaching lower the scholastic status of the pupils below the general average maintained in parallel classes?" This is the rock against which any co-operative program may be dashed to pieces. Since the continuance of the co-operative relationship depends in such a large degree upon this factor, it is incumbent upon the training institutions dependent upon co-operative arrangements to make periodical studies of this problem.¹⁸

Moreover, the debate concerning the advisability of maintaining a laboratory school for training teachers at the secondary-school level still rages in educational circles. In 1938, for example, the maintenance of such a school was discussed as a major issue in teacher education, as is indicated by the following statement:

Because this feature [supervised student teaching] of a teacher education curriculum is both difficult and costly to organize and maintain, and because its benefits have been difficult to isolate and evaluate, the practice and demonstration school has become the center of controversies in teacher education. Some assert that practice teaching is by far the most important part of the curriculum while others find arguments for dispensing with it entirely."¹⁹

These quotations show that from the beginning of the movement there has been felt a need for measuring results. The principal

¹⁷ William S. Gray, "The Results of Practice Teaching on the Pupils Taught," *Practice Teaching for Teachers in the Secondary Schools*, p. 36. United States Bureau of Education, Bulletin No. 29. Washington: Government Printing Office, 1917.

¹⁸ Ralph F. Strebelt, "The Scholastic Status of Pupils Taught by Student Teachers," *Educational Administration and Supervision*, XVIII (February, 1932), p. 99.

¹⁹ *American Council on Education Studies. Major Issues in Teacher Education*. February, 1938. Series I, Vol. II, No. 4, p. 37. Washington: The American Council on Education, 1938.

reason for the lack of more studies and of more carefully conducted experiments is probably best expressed in a statement in the quotation above, namely, "its benefits have been difficult to isolate and evaluate." There is another reason also, which is that supervisors of student teaching are so busily engaged with the details of supervising that they tend to neglect one of the most important phases of good supervision, evaluation. Concerning this condition, the following generalization in a well-known text on supervision is pertinent:

It is generally known that supervisors have not, as a rule, applied rigorous methods of measurement to the products of supervision. They have been more interested in the development of specific programs of activities than in their evaluation.²⁰

This is an unfortunate condition indeed, for until there are many investigations, using as exact measuring devices and techniques as possible, the constantly recurring question, "Will the public-school pupil be as well taught by the student teacher as by the regular teacher?" will not be answered. The professional implications of this question in the preparation of high-school teachers are weighty for the reason that the place, the kind, and even the amount of supervised student teaching are ultimately dependent upon the answer given.

EXTENT TO WHICH THE RESULTS OF ONE STUDY VERIFY THOSE OF ANOTHER

A factor making it difficult to determine the extent to which the experiments that have been conducted verify one another is the treatment of the data. More than two-thirds of the studies do not attempt to determine the reliability of the differences obtained. In some instances the investigators perhaps were correct in not attempting to apply this test because of the small number of cases, inadequate sampling, or both. Moreover, if the obtained results were close together, it was a relatively safe conclusion that the achievement of the two groups was practically the same. The studies in which the statistical significance of the observed differences was determined were those conducted by Seamster (59), Palmer (58), Strebel (10), Sister M. Rayneria Willison (61), and Smith (9).²¹ Of these five studies, the results of four, (59, 10, 61, and 9) showed that the differences in achievement between the control and the experimental

²⁰ A. L. Barr, William H. Burton, Leo J. Brueckner, *Supervision*, p. 798. New York: D. Appleton-Century Co., 1938.

²¹ Numbers in parentheses refer to articles or reports in the Bibliography.

groups were not statistically significant. Palmer (58), however, obtained significant differences in reading, arithmetic, and spelling—the three subjects in which she made comparisons. They were all in favor of the experimental group, a finding indicating that pupils taught by student teachers under the type of supervision operating in her experiment always obtained better results than those taught by classroom teachers under little or no supervision. Palmer's student teachers were very closely supervised. She tells us that the close supervision they received would have been an impossibility in the public schools.²² Not only, then, was the treatment of the data a variable, but also the amount and kind of supervision. The lack of detailed and discriminating exposition of the types of supervision rendered makes it impossible to state precisely to what extent one experiment verifies another even though the end results were reported to be the same.

The best examples of verification, however, are the experiments by Gray (50), who compared the averages of school marks of two groups at the end of the first semester of high school. One of his groups had been taught by student teachers before they were enrolled in high school, that is, in the elementary school, and the other had never been taught by student teachers. Cade and Gray (1) also compared two groups of high-school freshmen in elementary-school subjects by means of standardized tests in these subjects.

With a large number of subjects selected from as many as ten high schools, practically no difference was found in the average achievement scores of the two classifications. One experiment verified another. The statistical significance of the differences, however, was not determined. Similar examples of verification are the experiments by Strebel (10) and Smith (9), who used the same technique as Gray and as Cade and Gray, except that the pupils' experience of having been taught by student teachers was in the high school itself rather than in the elementary school. An additional refinement was that the differences were evaluated for their statistical significance. The details of all four of these experiments have been adequately described. It is sufficient to say that the second experiment in each pair verified the first, and that both pairs arrived at the same result, namely, that viewed as a whole there is very little, if any, difference in achievement of pupils taught by student teachers and of pupils taught by classroom teachers.

²² Sara G. Palmer, "A Comparative Study of the Achievement of Children in Training and Non-Training Schools," p. 19. Unpublished Master's Thesis, University of Pittsburgh, 1930.

UNSOLVED PROBLEMS AND ISSUES

Cade and Gray discovered that the training-school groups as a whole did slightly better work than the public-school groups when reflective processes were involved, but in the formal phases of school work, such as the fundamentals of arithmetic and spelling, the pupils who had been taught by the regular classroom teachers were ahead. The latter part of this conclusion was verified by Learned and Bagley (26), Welborn (12), Jamison (49), and Wellborn (60). On the other hand, Palmer (58) in a carefully controlled experiment, but with a comparatively small number of pupils, found statistically significant differences in favor of the group taught by supervised student teachers in the fundamentals of arithmetic and in column spelling. Palmer used the same spelling scale, the Ayres, that Cade and Gray used; yet the results were dissimilar. Palmer's pupils were in the third and fifth grades, whereas Cade and Gray's were high-school freshmen. The difference in age and type of school may have had a bearing upon the results. Moreover, Palmer's pupils were closely supervised, whereas the pupils in Cade and Gray's study had attended various training schools with presumably various types of supervision.

This lack of verification suggests some unsolved problems in the field. Among these are the following: 1. Do student teachers in general tend to do less well with tool or drill subjects than in subjects requiring discussion and reflective thinking? 2. Does the age of the pupils have anything to do with different results in teaching drill or tool subjects? 3. Is the problem essentially the same in the secondary school as in the elementary school? 4. To what extent are the results due to the amount and kind of supervision given the student teachers? 5. How successful would student teachers be as compared to classroom teachers with no more supervision than that given to the classroom teachers? 6. How long is it necessary for student teachers to teach under supervision before the achievement of the pupils is the same as, or greater than, that of the classroom teachers? 7. What is the best type of supervision to give student teachers from the point of view of maximum effectiveness of achievement and attitude on the part of the pupils? 8. What is the effect of student teaching upon the pupils' personality? 9. What is the effect of student teaching upon the student teachers' personality? 10. What effect does student teaching have upon the student teacher's knowledge of the subject? 11. What effect do student teachers have over the pupils' attitude toward the subject? 12. What attitude do pupils have toward student teachers?

NEED FOR AND PURPOSE OF OTHER INVESTIGATIONS

The problems listed above are unsolved. No one knows the answers to all of them except in terms of trial and error, so-called common sense, and empirical judgment. Scientific experimentation is needed to avoid waste from blunders and ill-advised schemes. The pupils' interests are paramount. The schools exist for the pupils, not for student teachers, supervisors of student teachers, or the teacher-training institutions they represent. Forty states and the District of Columbia now require student teaching for all who expect to teach in the public secondary schools. The number of states requiring student teaching has increased each decade since it was first required by California in 1906. An even greater number require student teaching for elementary teachers. As the number of states requiring student teaching increases, and as the demand for a greater amount of student teaching, emanating from organized groups interested in teacher education and from superintendents of schools, becomes more articulate, the greater is the need for accurate knowledge of the effect of student teaching upon the pupils taught.

Related investigations are also needed. For example, should this work of student teachers be followed up by the college supervisor for a year after they are regularly employed as classroom teachers? Should an internship under good supervision be required before a certificate is granted? What will be the effect of the intern's teaching upon achievement and attitude of the pupils? How many interns in proportion to the regular classroom teachers may safely be placed in a given school? Would it be harmful to the pupils if poor classroom teachers were replaced by good interns?

These and other problems might well be investigated. In fact, they should be investigated by carefully controlled experimentation if we choose to have our policies determined by research rather than by trial and error or empiricism. The purpose of such research is first to protect the pupils, and second to give prospective teachers opportunities for the optimum amount of practice compatible with a good learning situation.

LIMITATIONS IN PREVIOUS EXPERIMENTATION AND THE NATURE OF THE EXPERIMENTATION NECESSARY TO SECURE VALID RESULTS

This survey of research studies reveals certain limitations in experimental technique. A few will be enumerated.

First, there is the lack of a satisfactory means of obtaining objective data concerning the difference in pupils' achievement. This

is particularly evident in those studies that employ pupils' marks as the basis of determining differences in achievement. It is well known that a mark obtained by a pupil at the end of a semester is an unreliable measure of achievement.²³

A second limitation is inadequate sampling. This characterizes most of the research previously done in the field. It takes the form both of an insufficient number of pupils and of inadequate representation of population. Nearly all the studies save Gray's (50), Cade and Gray's (1), and Learned and Bagley's (26) fall short on this score.

A third limitation is inadequate controls. Unless groups comparable in initial achievement and general intelligence are provided, there is no means of knowing just how much the pupils achieve under the instruction of student teachers. Checking against standardized test norms is inadequate for the reason that pupils taught by student teachers, especially when the pupils are enrolled in a training school, may be decidedly superior in general intelligence. At the same time they may enjoy better-than-average home and social background. Moreover, the tests used for measuring progress should be valid; that is, they should cover material actually taught the pupils while the experiment was in progress. All the studies employing standardized tests fall short on this point.

The fourth limitation is a lack of a clear exposition concerning the nature of the supervision provided student teachers. Thus, none of the previously conducted studies, except Palmer's (58), described at all adequately the type of supervision provided. It appears from the internal evidence of some of the studies that a great deal of the actual teaching had been done by the critic teachers themselves. On the other hand, from Bagley and Learned's study (26), the impression is obtained that practically all the teaching was done by student teachers with little or no supervision. In others using a wide variety of schools (1 and 50, for example) the amount and kind of supervision was undoubtedly an uncontrolled variable.

Finally there is the limitation of determining the effectiveness of the student teacher's work by achievement alone. All the studies reviewed above used this criterion only. No attempt has been made previously to determine the effect of student teaching upon the pupils' attitude. Extension of research into this field was first pointed out as desirable by Franzén (18) and reiterated by Sister M. Rayneria

²³ William A. McCall, *How to Measure in Education*, pp. 58-59. New York: The Macmillan Company, 1929.

Willison (61); but up to the present no investigation has studied this important aspect of student teachers' effectiveness as instructors.

The experimentation necessary to secure valid results should avoid the defects mentioned. It should, for example, be based upon results obtained from valid objective tests; the pupils used in the experiment should represent adequately the population concerning whom the deductions are made; there should be adequate controls over the factor experimented upon; the supervision provided the student teachers should be clearly described; and an attempt should be made to include an evaluation of the pupils' attitude towards student teachers and the subjects taught by them. The latter is necessary because today we know that attitudes are more permanent possessions than mere knowledge and that an individual's attitude toward a person or school subject motivates him in achievement.²⁴

THE PROBLEM AND ITS SIGNIFICANCE

The purpose of the present study is to find, if possible, an answer to the question, "What is the effect of student teaching under carefully organized direction and supervision upon secondary-school pupils in achievement and attitudes?" In more specific terms the problem is to discover whether the high-school pupils in Lafayette and West Lafayette, Indiana, learn more, just as much as, or less in the so-called regular academic subjects under supervised student teachers from Purdue University than they do under regular classroom teachers. Related to the problem of achievement is the problem of attitude manifested by high-school pupils toward the student teachers and the subjects taught by them. This aspect of the problem is an extension beyond what has hitherto been attempted.

The results obtained for both achievement and attitude are conditioned by the nature of the supervision given the student teachers. This has been described in Chapter III of the complete study.²⁵ In brief it consisted in (1) conforming to the plan for guidance and selection of student teachers adopted by the faculty of Purdue University, (2) following a bulletin issued to critic teachers in which the critic teacher's procedure is described, (3) visiting each student teacher for a full class period at least once per week by the University supervisor, (4) holding an individual conference of a half hour's

²⁴ Edward B. Greene, *Measurements of Human Behavior*, pp. 515-516. New York: The Odyssey Press, 1941.

²⁵ Raymond R. Ryder, "Effect of Student Teaching on Secondary School Pupils in Achievement and Attitude." Chapter III, pp. 46-63, Doctor's dissertation, The University of Chicago, 1943.

duration once per week with each student teacher at the University in the supervisor's office, and (5) sending each student teacher a letter summarizing the visit and points discussed in conference. A duplicate letter was filed by the supervisor which was used in preparing for the next visit to the student teacher's classroom. In all, more than two hundred letters were sent to the student teachers included in the experiment. Four of the letters are included in the complete study.²⁶

The problem for the present writer was determined by both practical and theoretical considerations: practical because of the need arising from the desirability of measuring the effectiveness of supervised student teaching in the two public high schools co-operating with Purdue, and theoretical because no recent study has been reported in the educational literature pertaining to it. The most recent study was reported in 1935.²⁷

From the practical point of view it is important to make periodic evaluations of achievement and attitude.²⁸ Such evaluations are a function of the use of scientific principles as applied to education in general and to supervision in particular. In any public-school system co-operating with a college or university, it is desirable for both the director of supervised student teaching and the superintendent of schools to have as exact and accurate information as possible about how well or how poorly supervised college students are performing as teachers. Such information may forestall adverse criticism, which is almost certain to arise sooner or later. The superintendent may at any time be called upon by the board of education to supply information concerning the effectiveness of the teaching done by college students. The notion persists in many quarters, and often awaits only the opportunity for vociferous expression, that public-school pupils should not be practiced upon by college students in learning the art of teaching. At best, the maintenance of a system whereby opportunities are offered college or university students to fulfil licensing requirements by obtaining practice in teaching in a public-school system rests upon a delicate balance. Opponents to student teaching have attacked the co-operative arrangement as morally wrong.²⁹ If too much opposition is incurred from the patrons, opportunity for utilizing the schools in this manner may be denied.

²⁶*Ibid.*, pp. 54-61.

²⁷ Harry P. Smith, "The Student Teacher and High-School Achievement." *Journal of Educational Research*, XXVIII, (1935), 657-663.

²⁸ Strebel, *op. cit.*, p. 99.

²⁹ Mead, *op. cit.*, p. 142.

The following excerpt from a letter written to the author by a high-school senior concerning a student teacher whom she had had in a civics class expresses an attitude which, if at all widely shared by the students, might easily jeopardize the privilege of using the public schools as centers for student teaching.

It is a crime and a great injustice to high-school pupils to place a practice teacher in a class. The pupils' parents have paid for good teachers to educate their children. When a university, state or otherwise, permits college students ignorant of teaching methods—it can't all come from books—and ignorant of the natural ability of the pupils, to try to teach and experiment on the future business men and women of the community, it appears that they are being used just like guinea pigs. Teach college students who want to teach all you can out of books, but for the high-school pupils' sake, keep them out of the public schools.

The same attitude was expressed by a township trustee in response to the author's request to extend supervised student-teaching facilities to the academic classes in his school. Student teachers had been getting practice in teaching physical education in this school. The request was refused on the following grounds.

I don't object to practice teaching in physical education. In fact, I am glad to have it, for these college boys can be of real service to the coach in producing winning basketball, baseball, and track teams. But in the academic subjects, or in the regular classroom work, college students are not welcome except as observers. I won't permit college students to teach the regular academic subjects because I have made an effort to secure the very best experienced teachers I could get for the township schools. I pay my teachers good money, and I expect to get my money's worth.

These statements are not isolated examples. They may well occur in any public-school system used as a center for student teaching. They are quoted merely to show that studies are needed, if only to answer with facts persons who may be expressing an attitude opposing supervised student teaching. The latter usually have no facts to substantiate their point of view, or they may, like the pupil whose letter was quoted above, possess a limited number of facts applying only to a particular student teacher. In either case the answer has practical values.

Academic implications useful to the profession of teaching as a whole are perhaps even more important than the practical aspects contingent upon local application. Cumulative studies involving similar types of supervision and comparable pupils gradually build up a fund of evidence to contribute to our knowledge of established facts. This point was well stated by Wellborn more than a decade

ago, as follows: "The effects of student teaching on pupils in the public schools will not be accurately determined until data from many experiments have been collected and analyzed."³⁰

The author is interested professionally in this field since he has been engaged as a supervisor of student teachers for 18 years. The results obtained from the experiment to be described in the following chapters have their application not only in evaluating the effect of supervised student teaching upon the pupils taught in Lafayette and West Lafayette, Indiana, but also elsewhere. The results should have some application in all situations wherever supervised student teaching is administered under a carefully organized form of supervision. To be of utmost application these situations should be similar in respect to the personnel of the high-school pupils and the selection and training of the student teachers. Strictly speaking, however, the results apply only to supervised teaching as it is conducted at Purdue University in the so-called academic subjects. The reason is that the sample used in the experiment, although large, was confined to student teachers enrolled in this institution.

SUBJECTS AND METHOD

The present study compares the achievement in various high-school subjects of nearly one thousand paired high-school pupils taught by sixty-seven student teachers. The pupils were paired with high-school pupils in the same subjects and classes taught by regularly employed and licensed high-school teachers. The bases of pairing were the initial test score, converted into a T-score, and the I. Q. The pupils were all enrolled in the two high schools which co-operate with Purdue University in providing opportunities for supervised student teaching in the academic subjects. The larger, Jefferson High School, has an enrollment of about 1,200 pupils. It is in the city of Lafayette, Indiana. The smaller, West Lafayette High School, has an enrollment of about 300 pupils. It is in the twin city of West Lafayette. The academic curriculum in both high schools is similar.

The investigation was carried on for five semesters under as nearly identical conditions as possible. Five different classes or groups of student teachers were involved. The method of experimentation consisted in administering the state high-school tests for Indiana at the beginning of the training period for student teachers in all classes

³⁰ John W. Wellborn, "Effects of Student Teaching on Pupils in Two Algebra Classes in the Baldwin, Kansas, High School," p. 26. Unpublished Master's Thesis. The University of Kansas, 1931.

and, then, seven weeks later in repeating the tests and comparing the gains for the paired pupils. Attitude scales towards the teacher and the subject were also administered at the beginning and the end of the training period. Another means of evaluating the pupils' attitude towards the student teachers was the analysis, by three judges working independently, of unsigned compositions which the pupils wrote at the end of the training period. In these compositions the pupils stated why they liked or did not like the student teacher whom they had. The method in general may be described as experimental under as rigidly controlled techniques as could be applied in a public-school system.

CHAPTER II

ORGANIZATION OF THE EXPERIMENT AND GROSS FINDINGS IN THE PUPILS' ACHIEVEMENT

The experiment was organized in such a way that three purposes were served. A major purpose of the experiment was to find out how much or how well high-school pupils learned when taught by student teachers under the type of supervision provided. A second purpose was to discover the pupils' attitude towards student teachers and to see if their attitude towards the subject was any different when taught by supervised student teachers from what it was when taught by the regular high-school teachers. Still another purpose was to analyze the results of the student teachers individually in order to find out the probable causes why some obtained better results than the regular teachers and some obtained poorer results. In this chapter the gross findings concerning the pupils' achievement will be presented and discussed.

Specifically, the experiment was organized to measure the achievement of high-school pupils between the time the student teacher assigned to a given class began to teach regularly for a full period and the time when the course was completed. This was a period of seven weeks approximately, or thirty-six days. Every student teacher actually taught for a full period a minimum of thirty-six lessons after three weeks of observing in the class and assisting the critic teacher in procedures which did not involve actual teaching. The teaching done by each student teacher was all conducted in one class with the critic teacher present practically all the time. The pupils' attitude toward the student teacher and toward the subject was measured during the same time. All measurements of achievement and most of those in attitude were made on the comparative basis; that is, comparisons of pupils' gains under student teachers were made with those of comparable pupils under the instruction of the regular high-school teachers.

DESCRIPTION OF THE EXPERIMENT

The measurements were taken over a period of time lasting five semesters, or two and one-half years. In a sense, the experiment was conducted five times. All conditions or factors were held as uniform as possible each time the experiment was repeated. Except

for the fact that the personnel of the student teachers was different, the experiment was the same each semester. All student teachers were selected on the same basis each semester. They also had to meet the same requirements. All factors affecting the pupils' learning were held the same or normal for all classes, with the one exception that in an experimental class a supervised student teacher became the instructor. This was the experimental factor; and, therefore, classes taught by the student teachers are called the experimental classes in the following discussion. Classes taught by the regular teachers were the control classes and are referred to as such throughout this study. Not all pupils in either the student teachers' or regular teachers' classes were employed in the measurement of gains or losses in learning during the time the experimental factor was introduced. Only those who could be matched on the basis of initial achievement test score and I.Q. were considered.

The value of repeating the experiment under essentially the same conditions is that the results are either verified or disproved in this manner. If they are essentially the same, the results must be true. This is of the essence of scientific experimentation, but it is often omitted in experiments conducted in the field of education. The five semesters in which measurements were made of the effects of student teachers' work were as follows: first semester of 1935-36, second semester of 1935-36, first semester of 1936-37, second semester of 1936-37, and the second semester of 1937-38. These semesters are typical of the work as it is being conducted at the present time. Since the work is conducted now in all essential respects as it was then, the results reported are applicable to what is now being accomplished.

NUMBER OF STUDENT TEACHERS INVOLVED AND SUBJECT-MATTER AREAS

There were sixty-seven student teachers whose work was measured. Of these, thirty-two were men and thirty-five were women. These student teachers taught in the following ten subject-matter areas: English, American history, world history, civics, economics, plane geometry, algebra, arithmetic, biology, and chemistry. If considered from the point of view of first and second semesters, such as 9B or 9A English for example, there were twenty courses in which student teachers taught. Measurements were made in all of these fields or areas of the gains of the pupils taught by student teachers.

These were then compared with gains made by comparable pupils taught by the regular high-school teachers whose pupils were likewise measured at the same time.

The experiment was designed and organized in such a way that the measurements taken covered the same work, period of time, type of student teacher, high schools, type of high-school pupils, and kind of supervision as is ordinarily the situation from semester to semester and from year to year. In other words, the experiment was designed to be useful in evaluating the work that is being done by student teachers at Purdue University who are obtaining practice teaching experience in the academic subjects. It possesses this function because the findings were obtained from a large and representative sample of pupils and student teachers and also because they are based upon results obtained from objective rather than subjective tests.

TESTS USED IN MEASURING ACHIEVEMENT

The tests used in measuring achievement were the State High-School Tests for Indiana and, in a few cases, well-known standardized commercial tests in high-school subjects. A list of the tests used is presented in Table 1. The Indiana State High-School Tests are objective tests in various subject-matter areas, such as algebra, geometry, biology, chemistry, American history, world history, and English. They have been prepared semi-annually as first and second semester tests each year since 1930 by subject-matter experts in high schools and colleges under the direction of the Indiana State Test Committee. These tests are based upon the curricular content of the state-adopted textbooks and the state course of study. High-school teachers in Indiana are directed by the State Board of Education to use the textbooks on the state-adopted lists. The fact that the test material was based upon state-adopted textbooks whose use is required by a regulation of the State Board of Education may be considered as evidence that the tests covered the subject matter which was actually taught by both the student teachers and the regular classroom teachers. In regard to the validity of the State High-School Tests as instruments for measuring the achievement of pupils, Remmers says: "The validity of the tests as related to curricular content is unquestionably high because (1) they are based upon the printed course of study; (2) they are prepared co-operatively by subject-matter experts in high schools and colleges; and (3) every test item

TABLE 1

TESTS USED IN MEASURING ACHIEVEMENT

<i>Class</i>	<i>Test</i>
1. English 9B, 10B, 11B, and 12B (These classes stress grammar and form in composition.)	The Purdue Placement Test in English
2. English 9A, 10A, 11A, and 12A (These classes stress American and English literature.)	State High-School Tests for Indiana: 1. Understanding and Appreciation of Poetry 2. Prose Appreciation Test (Senior High School) (Junior High School for English 9A) by Herbert A. Carroll
3. Algebra 9B Algebra 9A Advanced Algebra	State High-School Tests for Indiana: First Year Algebra, First Semester First Year Algebra, Second Semester Advanced Algebra
4. Geometry 10B Geometry 10A	State High-School Tests for Indiana: Plane Geometry Test, First Semester Plane Geometry Test, Second Semester
5. Biology 9B	State High-School Tests for Indiana: Biology Test, First Semester
6. Chemistry 12A	State High-School Tests for Indiana: Chemistry Test, Second Semester
7. Arithmetic	Diagnostic Tests in the Fundamental Operations of Arithmetic and in Problem Solving by W. C. Reavis and E. R. Breslich
8. United States History 11B United States History 11A	State High-School Tests for Indiana: American History, First Semester American History, Second Semester
9. Modern European History 10A	State High-School Tests for Indiana: World History Test, Second Semester
10. Citizenship 9B	State High-School Tests for Indiana: Junior High-School Civics Test
11. Economics 12B	State High-School Tests for Indiana: Economics Test, First Semester
12. History 10B	State High-School Tests for Indiana: World History Test, First Semester

is finally evaluated by from 20 to 50 high-school teachers in Indiana teaching the subject the tests for which they evaluated."¹

Statistical evidence for the reliability of these tests is furnished by Remmers in his report.² By using a random sampling of 300 pupil papers for each test, his calculations show that the median value of the coefficients of reliability is higher than that obtained by Ruch from 149 standardized commercial tests in high-school subjects.³ The

¹ H. H. Remmers, "The Achievement of Our High Schools—Results of the State High-School Testing Program," 1930-1931, p. 10. *Studies in Higher Education*, XVIII, No. 2. *Bulletin of Purdue University*, Vol. XXXII. Lafayette, Indiana: Purdue University, 1931.

² Remmers, *op cit.*, p. 10.

³ G. M. Ruch, *The Objective or New Type Examination*, pp. 140-144. Chicago: Scott Foresman and Co., 1930.

median value for the latter was found to be .75, whereas the median value for these tests was .914.

After the pupil's test papers had been scored and checked for errors, the raw scores were converted into T-scores for the purpose of making the scores from the different tests directly comparable.⁴ Moreover, since most of the tests used were the State High-School Tests for Indiana, it was convenient to use the T-score tables furnished by the State Test Committee for converting the raw scores into comparable T-scores. The booklet of norms issued each semester by the committee states: "The T-scale method of making all scores comparable has been selected by the State Committee as the most satisfactory. By means of the T-scores on each test, any score is comparable with any other."⁵

TESTING PROCEDURE

The plan adopted for the collection of data consisted in giving an appropriate objective test to the pupils of each student teacher during the first week of the student's teaching, and then to give the same test again seven weeks later. The second time the test was given was at the end of the student's experience as a supervised student teacher. Classes in the same subject taught by regular high-school teachers were given the same tests on the same day or, if this was not possible, on the day preceding or the day following. The tests were given in the student teachers' classes by the critic teachers and in the parallel classes by the regular teachers. The teachers did not know the purpose of the experiment, but considered it a part of the regular testing program of the school encouraged by the State Department of Education as one of the criteria for maintaining a first-class high school. Specific typewritten directions were given to each teacher under the name and signature of the superintendent of schools and the immediate supervision of the high-school supervisor in charge of testing. As a part of the high-school testing program, the latter had trained the high-school teachers how to give standardized tests according to uniform directions. After the tests were given, the teachers were directed to return the tests immediately to the high-school office. Here they were scored by a competent former high-school teacher who, under the auspices of the

⁴ Henry E. Garrett, *Statistics in Psychology and Education*, pp. 156-157. New York: Longmans, Green and Company, 1937.

⁵ H. H. Remmers, *First Semester Norms for the High-School Tests of Indiana*. Preliminary Report. Long-Term High Schools (9, 9½, and 10 months), p. 1. Lafayette, Indiana: Purdue University, 1936.

Works Project Administration, was employed in assisting the supervisor of testing and guidance in scoring tests and tabulating the results.⁶ All the scoring and tabulating was inspected carefully the second time for any possible errors. Approximately 3,000 pupils were administered initial achievement tests.

PAIRED SUBJECTS

Student teachers taught 1,497 pupils distributed as follows: for the first semester of 1935-36, one hundred thirty-seven; for the second semester of 1935-36, four hundred eighty-six; for the first semester of 1936-37, two hundred forty-six; for the second semester of 1936-37, three hundred forty-seven; and for the second semester of 1937-38, two hundred eighty-one. From the total group of nearly 1,500 high-school pupils taught by student teachers during the semesters mentioned, 947 pupils were selected who could be matched by initial achievement test score and I.Q. with 947 pupils taught by the regular high-school teachers. Thus, for the first semester of 1935-36, it was found that 99 pupils taught by student teachers could be matched with 99 pupils taught by the regular high-school teachers. In like manner 402 pairs were found for the second semester of 1935-36; 129 pairs for the first semester of 1936-37; 179 pairs for the second semester of 1936-37; and 138 pairs for the second semester of 1937-38. The pupils were not paired by sex, but for the groups as a whole the sexes were fairly evenly divided. Thus, of the total group of pupils 512 boys were taught by student teachers and 508 boys were taught by the regular teachers. Likewise 435 girls were taught by student teachers and 439 by regular teachers.

JUSTIFICATION OF MATCHING PROCEDURE

Although, as McCall points out, "equating is usually done on just one basis,"⁷ in this experiment two factors were used in equating the groups, namely, (1) initial status in achievement and (2) general intelligence as indicated by the Otis I.Q. The assumption upon which this procedure is based is that there is more likelihood of securing equivalent groups in this manner than by equating the groups upon one factor alone. Thus Peters and Van Voorhis say in respect to matching:

⁶ Miss Edith Peters, M.S., Purdue University, Scorer and Statistician.

⁷ William A. McCall, *How to Experiment in Education*, pp. 57-58. New York: The Macmillan Company, 1923.

If the persons are somewhat along the curve of learning, match on the basis of good objective measures of the present status in the function to be experimented upon. Use at least some of the same tests, or forms of the same tests, that are to be employed at the end of the experiment. . . .

A better basis than any measure of present attainment alone is a combination of some measure of present attainment, particularly a measure of the initial status in the function under investigation, and a measure of prospective speed of progress—intelligence quotient or educational quotient. These two measures should not be averaged but should be used as simultaneous bases.⁸

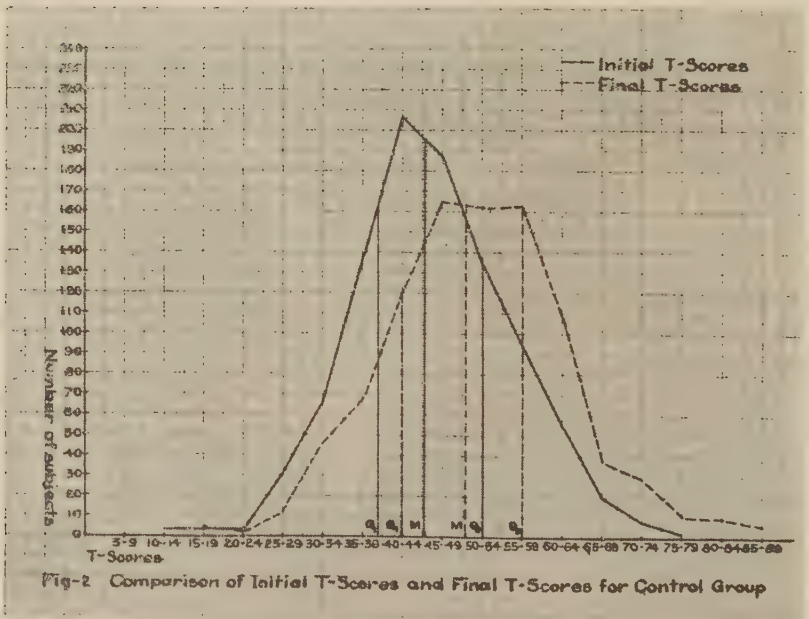
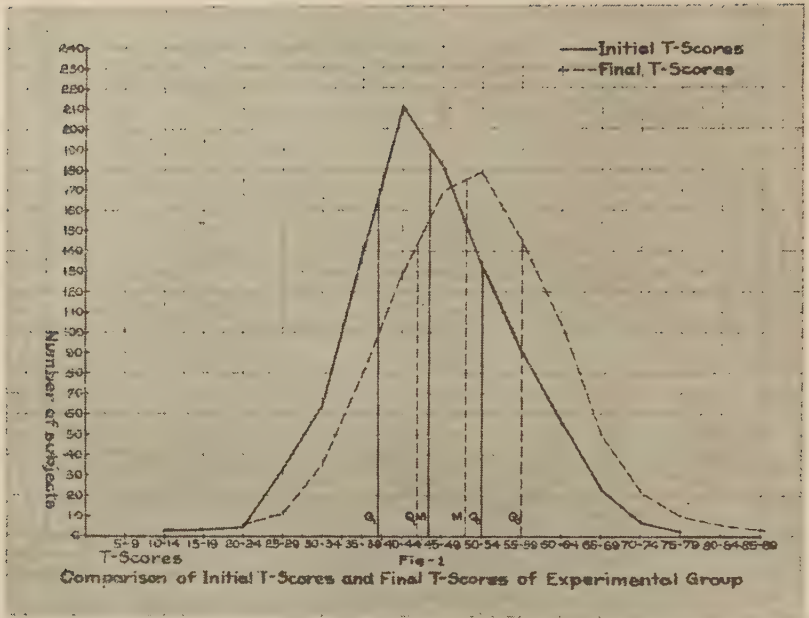
In the present experiment the two bases mentioned above were used simultaneously. They were not averaged even though using them simultaneously made it necessary to eliminate about one-third of the pupils taught by student teachers. From a total of 1,497 pupils taught by student teachers only 947, or 62.25 per cent, could be matched on the two bases simultaneously. The remaining 550 pupils taught by supervised student teachers were dropped from the experiment.

The I.Q. rather than the mental age was chosen as the second basis for the reason that competent authorities recommend its use.⁹ An additional reason of practical import was that the official school records contained this index rather than the mental age. The I.Q. was obtained from the Otis Self-Administering Tests of Mental Ability, Form A. Jefferson High School first gave this examination to the 1,223 pupils enrolled on October 10, 1935. Thereafter in each succeeding October the incoming freshmen and transfer pupils were given the same intelligence tests by the high-school supervisor in charge of guidance and testing. At the West Lafayette High School the same intelligence test was given by the school psychologist before the pupils entered high school. The I.Q. for each pupil was thus readily available in the high-school offices. Student teachers were taught to use these records as a part of their training in learning the art of individual instruction. It was therefore convenient to use the same measure in this study.

The purpose of the matching procedure was to secure two groups essentially alike in mean learning ability and present status in achievement (at the time the student teachers took over the work) in the high-school subject which was to be taught by a student teacher.

⁸ Charles C. Peters and Walter R. VanVoorhis, *Statistical Procedures and their Mathematical Bases*, p. 450. New York: McGraw-Hill Book Co., 1940.

⁹ *Ibid.*, p. 450. Also, Frank N. Freeman, *Mental Tests, Their History, Principles and Applications*, p. 99. New York: Houghton Mifflin Company, 1926.



The question may arise as to why the pupils were paired when all that was desired was to secure two groups who were essentially alike in mean learning ability and also in the distribution of ability to learn. The question is well answered by Peters and Van Voorhis as follows:

It is possible to achieve this by manipulating the membership of the groups until the mean scores for capacity to learn are the same on both sides, and the standard deviations, and perhaps the indices of skewness and kurtosis, are alike. This is a perfectly legitimate way. But these ends can be achieved much more surely and easily by matching individuals in pairs. We have on our list, let us say, a student, A, in the experimental group with a certain learning score, and we seek for him a mate, A¹, in the control group who has the same capacity to improve. Then we take in the experimental group a second person, B, and seek a mate, B¹. Thus we continue making pairs until we have constructed all that the personnel of our two groups permits. When groups are matched in this individual-pair method, it is automatically provided that the means of the capacity scores shall be the same for the two groups and that the shape of both distributions shall be alike.¹⁰

The writer's data as shown by the distribution of T-scores (Tables 2 and 3, and also Figures 1 and 2) show that evenly matched groups were procured in respect to the initial T-score by the method adopted of pairing individuals and that the shapes of both distributions were alike. Thus, the mean initial T-score for the experimental group was 45.66 and for the control group was 45.77. The standard deviation of the experimental group was 9.97 and for the control group 9.89. These figures show clearly that the two groups were very evenly matched in respect to achievement in subject matter when the experiment was begun. The same is true of the I.Q. The tabulation of the I.Q.'s (see Table 4) shows that the mean I.Q.'s for the experimental and control groups were nearly the same, namely, 104.42 and 104.40, respectively. The standard deviation of the I.Q. for the experimental group was 10.90 and for the control group 10.38. It is thus plainly evident that the procedure adopted resulted in almost perfectly evenly matched groups in respect to initial achievement in subject matter and in I.Q., or capacity to learn.

¹⁰ Peters and VanVoorhis, *op. cit.*, p. 448.

TABLE 2
DISTRIBUTION OF INITIAL T-SCORES FOR EXPERIMENTAL GROUP
ALL SEMESTERS

Scores	Tabulation for Each Semester					F	d	Fd	d ²	Fd ²	Calculated Results
	I	II	III	IV	V						
85-89	..	..	..	..	..	.....	...	.....	..	.....	.....
80-84	..	..	..	..	..	.....	...	.....	..	.....	.....
75-79	..	..	2	..	..	2	7	14	49	98	.....
70-74	5	..	1	..	1	7	6	42	36	252	.....
65-69	4	2	5	2	10	23	5	115	25	575	.....
60-64	10	5	8	5	28	56	4	224	16	896	.....
55-59	15	11	12	13	39	90	3	270	9	810	.....
50-54	25	12	18	17	59	131	2	262	4	524	.....
45-49	27	21	30	19	85	182	1	182(+1109)	1	182	.....
40-44	40	32	29	23	86	210	...	.....	..	.....	.....
35-39	27	30	14	12	56	139	-1	-139	1	139	.....
30-34	12	12	8	5	27	64	-2	-128	4	256	.....
25-29	10	4	6	3	10	33	-3	-99	9	297	.....
20-24	1	..	2	..	1	4	-4	-16	16	64	.....
15-19	2	..	1	..	..	3	-5	-15	25	75	.....
10-14	1	..	2	..	..	3	-6	-18(-415)	36	108	.....
Mean						N = 947		694		4276	.....
SD											45.66
σM											9.97
Q ₁											.32
Q ₃											39.17
											52.26

TABLE 3
DISTRIBUTION OF INITIAL T-SCORES FOR CONTROL GROUP
ALL SEMESTERS

Scores	Tabulation for Each Semester					F	d	Fd	d ²	Fd ²	Calculated Results
	I	II	III	IV	V						
80-84	..	..	..	..	..	.....	...	.....	..	.....	.....
75-79	..	..	2	..	..	2	7	14	49	98	.....
70-74	2	..	1	..	5	8	6	48	36	288	.....
65-69	9	2	5	1	3	20	5	100	25	500	.....
60-64	28	3	8	5	11	55	4	220	16	880	.....
55-59	39	15	12	12	16	94	3	282	9	846	.....
50-54	61	16	18	13	26	134	2	268	4	536	.....
45-49	88	19	30	23	27	187	1	187(+1119)	1	187	.....
40-44	83	24	29	29	41	206	...	.....	..	.....	.....
35-39	55	12	14	30	24	135	-1	-135	1	135	.....
30-34	28	5	8	13	12	66	-2	-132	4	264	.....
25-29	9	3	6	3	10	31	-3	-93	9	279	.....
20-24	..	..	2	..	1	3	-4	-12	16	48	.....
15-19	..	..	1	..	2	3	-5	-15	25	75	.....
10-14	..	..	2	..	1	3	-6	-18(-405)	36	108	.....
Mean						947		714		4244	.....
SD											45.77
σM											9.89
Q ₁											.32
Q ₃											39.34
											52.35

ILLUSTRATION OF MATCHING PROCEDURE

In order to show concretely just how the matching was done, Plate I is presented. It is a photostatic copy of a portion of the original worksheet employed for pairing the pupils for the first semester, 1935-36. The worksheets for each semester are identical in form. Similar worksheets were constructed for each of the sixty-seven student teachers included in the experiment. Plate I shows clearly the essential features to be found for matching the pupils in each student teacher's class. The first important point to note in Plate I is the rows in which no entries are made on the right-hand side. Thus, there are two rows for the first student teacher and five rows for the second student teacher in which no entries have been made. This means that no pupil could be found who was taught by any of the regular teachers whose record in respect to initial T-scores and I.Q. would match that of a pupil taught by a student teacher. In other words, these pupils could not be matched by the criteria adopted.

The first of the two criteria for matching the pupils, which was adopted empirically in the beginning and followed consistently throughout all of the matching process, was that a pupil, in order to be included in the control group, had to possess the same initial T-score as a pupil taught by the student teacher, or one that was not more than two points above or below. Moreover, as the names of the pupils indicate, no pupil in a regular teacher's class could be used twice. The second criterion was that simultaneously the pupil in the regular teacher's class had to have the same I.Q. as a pupil taught by the student teacher or an I.Q. not more than ten points removed, above or below, from the I.Q. of a pupil in the student teacher's class. This apparently wide leeway in matching the I.Q.'s. was justified from two points of view: first, it was not the primary basis of matching, as was the T-score or initial status in achievement—the function to be experimented upon—but was secondary; and, second, the results show (see Table 4) that a control group was obtained which has an average I.Q. almost identically the same as the average I.Q. of the experimental group and one, too, whose standard deviation was almost the same as the standard deviation of the I.Q. for the experimental group.

Attention should be directed also to several other items in Plate I. One of these is that under the column headed *Subject* all the pupils in both groups were enrolled in English 10B classes. English 10A pupils were not used, for example, to match pupils in English 10B classes. The pairing was restricted to pupils in the same subject and

First Semester 1935-36 T-Scores																	
Experimental			Objective			Achievement Tests			Control			Objective			Achievement Tests		
Group	Teacher	Initial	Final	Diff.	I.Q.	Subject	School	Group	Teacher	Initial	Final	Diff.	I.Q.	Subject	School		
Roxina S.	Miss B.	56	58	2	113	English	Jeff H.S.	Dorothy D.	Miss S.	56	61	5	109	English	Jeff H.S.		
Stanley N.	(Teacher)	55	59	4	115	Grammar	"	Paul J.	"	55	58	3	120	"	"		
Frances C.	Miss W.	53	51	-2	117	Composition	"	Kenneth W.	"	53	50	-3	113	"	"		
Maryl	(Teacher)	49	50	1	110	Test used	"	Maurice C.	"	49	56	7	106	"	"		
Richard A.	"	48	43	-5	90	Placement	"	Ralph V.	"	48	51	3	90	"	"		
Gilbert F.	"	47	54	7	115	Test in English	"	Arthur C.	Miss W.	47	51	4	111	"	"		
Margaret H.	"	46	45	-1	97	"	"	Margaret R.	"	46	42	-4	105	"	"		
Louise F.	"	46	40	-6	93	"	"	Josephine H.	Miss S.	45	46	1	94	"	"		
Virginia H.	"	44	48	4	106	"	"	Eugene B.	"	44	50	6	102	"	"		
Mary C.	"	44	38	-6	94	"	"	Earl G.	"	44	42	-2	94	"	"		
Chester E.	"	42	50	8	94	"	"	John L.	"	42	39	-3	91	"	"		
Bill S.	"	42	47	5	110	"	"	Ellen T.	Miss W.	42	45	3	113	"	"		
George C.	"	41	39	-2	98	"	"	Francis J.	Miss S.	42	49	7	99	"	"		
Tom D.	"	41	38	-3	92	"	"	Maxine T.	Miss W.	41	39	-2	90	"	"		
Jimmy D.	"	38	37	-1	92	"	"	John S.	Miss S.	38	48	10	93	"	"		
Mary C.	"	38	42	4	88	"	"	Lois S.	Miss W.	37	32	-5	94	"	"		
Melvin D.	"	38	39	1	95	"	"	Paul H.	Miss S.	39	46	7	93	"	"		
Betty D.	"	33	36	3	102	"	"	Elsie G.	"	34	40	6	108	"	"		
Joseph D.	"	32	37	5	89	"	"										
Harold K.	"	30	39	9	91	"	"										
Milford D.	"	27	44	17	93	"	"	Todd M.	Mrs. M.	26	42	16	91	"	W. Laf. H.S.		
Richard T.	Miss G. (Teacher)	67	64	-3	118	English	W. Laf. H.S.										
Theodore M.	(Teacher)	61	62	1	121	Grammar	"	Orval H.	Miss W.	60	56	-4	126	English	Jeff H.S.		
Carol H.	Mrs. M. (Teacher)	59	57	-2	120	Composition	"	Mary W.	Miss S.	59	60	1	115	"	"		
Robert J.	"	58	58	0	117	Test used - Placement	"	Eagar T.	"	58	59	1	121	"	"		
Eileen A.	"	55	65	9	114	"	"	Fideline D.	"	57	64	7	110	"	"		
Mary K.	"	53	54	1	119	"	"	Mary C.	Mrs. M.	56	54	-2	108	"	W. Laf. H.S.		
Mary G.	"	53	64	10	116	"	"	Victor K.	Miss W.	54	55	1	113	"	Jeff H.S.		
Margaret K.	"	52	61	9	114	"	"	Thelma C.	Miss S.	54	54	0	107	"	"		
Robert K.	"	52	67	14	124	"	"	Jessie M.	Miss S.	52	54	2	119	"	"		
Kenneth M.	"	52	55	3	114	"	"	Paul R.	"	52	52	0	117	"	"		
Phyllis T.	"	52	55	3	102	"	"	Mary D.	"	52	62	10	101	"	"		
Carl G.	"	50	50	0	111	"	"										
Janet M.	"	50	51	1	117	"	"	Phyllis Y.	Miss S.	51	47	-4	113	"	Jeff H.S.		
Morrison C.	"	49	54	5	104	"	"	Lawrence W.	Mrs. M.	49	54	5	100	"	W. Laf. H.S.		
Ray F.	"	47	38	-9	98	"	"	Margaret Y.	"	47	47	0	100	"	"		
Russell C.	"	45	58	13	108	"	"	Miles N.	Miss S.	45	49	4	113	"	Jeff H.S.		
Dwight S.	"	44	50	6	89	"	"	Raymond P.	Miss W.	44	43	-1	92	"	"		
Richard S.	"	43	49	6	112	"	"	Earl G.	"	43	47	4	106	"	"		
Harold R.	"	41	49	8	121	"	"	Robert L.	Mrs. M.	41	52	11	111	"	W. Laf. H.S.		
Harold M.	"	38	45	7	102	"	"										
Betty S.	"	38	49	11	104	"	"										
Robert B.	"	27	39	12	92	"	"										

Plate I. Matching process for two student teachers.

at the same semester level. The same procedure was followed in all the matching. No pupil was selected for the control group to match an individual in the experimental group who did not belong to another section of the same class during the same semester. This might then be called a third criterion for matching.

It may be noted from the data presented in Plate I (see Column 10) that not all the pupils in the control group had the same teacher; that is, it is apparent that they were drawn from various sections of the same class. Also, from the last column in the control group, under *School*, it may be seen that they did not all come from the same school. In defense of this procedure it may be said that the purpose was not so much to match individuals as to match groups whose means and standard deviations would be approximately the same. Moreover, this procedure not only resulted in a larger number of pupils who could be matched or paired, but it had the added advantage of obliterating or reducing the influence of one teacher. Selecting pupils from the control group according to the closest match in initial achievement and general intelligence tended to control the factors affecting learning which might be due to one teacher's personality or teaching skill. After all, the purpose of the study was to contrast the supervised student teachers' efficiency as measured by gains in pupil achievement with that of the regular teachers in the two high schools. The purpose was not to contrast the efficiency of one student teacher with that of a certain classroom teacher. It may be said, therefore, that whatever factors were operating to affect the outcome of the experiment, due to the personality, skill in teaching, or other attributes of a given regular teacher, they tended to be cancelled by selecting pupils from the classes of several regular teachers. In regard to the *School* (see Column 16, Plate I), an effort was made, whenever a choice was possible, to select pupils for the control group who were members of the same school as the pupils in the experimental group. This is plainly evident in the case of the first student teacher, Miss B., in Plate I. Here all of the pupils are from the same school except one. In the case of the second student teacher, Miss G., it was not possible to secure many pupils from the same school for the reason that there was only one other section. The rule was followed consistently to select for the control group pupils who matched the closest from the same school if possible, but when this was not possible to select them from the other high school in the cities used as a training center for student teachers. Since 47 of the 67 student teachers, or 70 per cent of the total number, were placed in the larger high school, it is apparent that the majority of the pupils constituting the matched pairs were members of the same school.

COMPARISONS OF ACHIEVEMENT FOR FIVE SEMESTERS

There were five semesters in which the work of supervised student teachers as it affected pupil achievement in the high-school subjects was compared with that of regular high-school teachers. Since the experiment was conducted in an identical manner each semester, it was permissible to combine the results from the five semesters. All scores had been converted into T-scores, which made it possible to treat the data in the manner indicated. Combining the scores provided a larger as well as a more representative sampling of the population of the two schools from which the data were obtained. Not only so, but a wider and more representative sample of student teachers was obtained from five semesters than from one.

More confidence can, therefore, be placed in the results obtained from the large group in which the semester results have been combined than from the smaller groups representing each semester. However, as will be shown in the later discussion, the results obtained for each semester are in the main in agreement with those obtained for the experimental and control groups as a whole. The results obtained for all pupils, in all subjects and all semesters, are shown in Table 4. The observed difference in final achievement between the experimental and control groups is 0.15 points on the T-scale. Since the critical ratio is only 0.47, this difference is not statistically significant.

TABLE 4

MATCHED PAIRS, FIVE SEMESTERS, 1935-38

(All Pairs Matched on Initial T-Scores, I.Q.'s, and Subject. Experimental Group Taught by Directed Student Teachers, Control Group Taught by Regular Teachers.)

	Experimental	Control
Number of pupils.....	947	947
Mean initial T-score.....	45.66±.32*	45.77±.32*
Standard deviation of initial T-score.....	9.97	9.89
Mean I.Q.	104.42±.35*	104.40±.34*
Standard deviation of I.Q.'s.....	10.90	10.38
Mean final T-score.....	50.99	50.84
Standard deviation of final T-scores.....	10.70	11.40
Observed difference of final T-scores (experimental minus control).....	.15	
Standard errors of final T-score means.....	.35	.37
Standard error of difference.....	.32	
Critical ratio	.47	
Correlation between final T-scores (experimental and control groups) : .61		

* Standard error.

The chief generalization that may be deduced from the part of the study dealing with achievement is that the measured difference in the amount learned by all the pupils taught by student teachers is certainly no less than the amount learned by comparable pupils taught by the regular high-school teachers. The experimental group gained 5.33 points on the T-scale and the control group 5.07 points. As the discussion in Chapter III will show, the results obtained for each semester are much the same as for all of the semesters combined. In no semester was a difference between the means found which was statistically significant at a level of confidence as high as 1 per cent. None the less, the semester results will be found to vary from one semester to another—sometimes being in favor of one group and sometimes of the other. These fluctuations are to be expected when the differences are not large enough to be statistically significant. As shown in Table 4 the difference in mean achievement between the experimental and control groups is not great enough to nullify the hypothesis that one group has learned as much as the other, or that there is no true difference in achievement.¹¹ The group taught by supervised student teachers is slightly ahead in observed results, it is true; but the amount by which they exceeded the control group is not sufficiently great to warrant the conclusion that such would always be the case. The best conclusion we may draw is to accept the hypothesis that there is no true difference in achievement between the two groups. In other words, high-school pupils taught by student teachers under the type of supervision provided learn just as much as those taught by the regular teachers.

This finding is significant educationally because it is the common belief of many people that pupils so taught learn less because of the inexperience of student teachers. No evidence was found to support this view. Under supervision student teachers obtain just as good results as the regular teachers themselves.

COMPARISON OF UPPER AND LOWER QUARTILES

Further analysis of the data is not only possible but desirable. The results obtained permit the comparison of upper and lower quartiles as determined by the initial achievement tests. More complete analysis of the data at hand will serve to answer the question as to whether the supervised student teachers did as good work with either the good or poor learners of the group as they did with the

¹¹ E. F. Lindquist, *Statistical Analysis in Educational Research*, p. 16. Boston: Houghton Mifflin Company, 1940.

average. The following discussion deals with a comparison of the results obtained by both the brighter and the duller pupils taught by supervised student teachers with similar pupils taught by the regular high-school teachers.

The statement is frequently made by writers in the fields of educational psychology and methods of teaching that teachers should pay more attention to individual differences than they are inclined to do in the present well-nigh universal system of group instruction. Judd says, for example:

The teacher is always making adjustments in order to keep the class moving as a more or less unified group. If there is a dull pupil in the class, the teacher feels compelled to give special attention to that pupil's slow progress lest he be left hopelessly behind. The class as a whole is thus slowed down. The bright members of a class, who learn easily, very frequently become irked by the slow rate of progress of their less gifted classmates.¹²

Minnick, speaking of methods of teaching mathematics in the secondary school, says:

Another aim should be to give to the smaller group of individuals who have a high degree of mathematical ability a mastery of such elements of mathematics and mathematical methods as will make it possible for them to specialize in the field of mathematics or other fields related to mathematics. Although this aim applies to a small group of individuals, it is one of the most important. It is through the work of these specialists that progress in science gives its indirect values to humanity. . . . Unfortunately, the present tendency is to reduce standards and requirements to the level of the students whose mathematical abilities are low, to the great disadvantage of those who are mathematically strong.¹³

In the field of supervised student teaching a recent book gives the following advice:

Other things being equal, school tasks will be more interesting and more meaningful if the work is adjusted to individual differences. . . . We need to realize that the problem is growing more acute by virtue of the fact that pupils with very low skills in the fundamentals of reading, computation, etc., are entering the secondary schools. . . . Such a group may include an excessive number of pupils who are unadjusted because of personality traits, thus presenting a more perplexing array of individual differences.¹⁴

¹² Charles H. Judd, *Educational Psychology*, p. 548. New York: Houghton Mifflin Company, 1939.

¹³ J. H. Minnick, *Teaching of Mathematics in Secondary Schools*, pp. 40-41. New York: Prentice-Hall, Inc., 1939.

¹⁴ Raleigh Schorling, *Student Teaching, An Experience Program*, p. 134. New York: McGraw-Hill Book Co., Inc., 1940.

The twenty-fifth percentile. The data presented in Table 5 reveal one of the more important discoveries made in this study. Table 5 shows that more relative progress was made by the experimental group at the quartile points than was made by the control group. Let us look first at Q_1 of the initial T-scores for the experimental and control groups. The scores are 39.17 for the experimental and 39.38 for the control. These scores indicate the upper limit of the lower 25 per cent in achievement when the supervised student teachers began their period of training as classroom instructors. The difference between Q_1 for the experimental group and Q_1 for the control group when the experiment was begun was slightly in favor of the control group. At the end of the training period, however, Q_1 for the experimental group was 1.24 points higher than for the control group. When this difference was evaluated for its statistical reliability, it was found to be significant. The degree of confidence with which the null hypothesis may be rejected is higher than that required at the 1 per cent level. The critical ratio is 2.88, which is large enough to indicate that a true difference exists. In other words, we may be virtually certain that lower-than-average pupils make better progress under Purdue supervised student teachers than they do under the regular teachers. These figures offer proof, then, that the supervised student teachers in the academic subjects from Purdue University under the type of supervision provided secure better results with slow or dull pupils in terms of achievement than do the regular teachers alone.

It is not only of interest but of importance to make the discovery that dull pupils make more progress when a student teacher has been assigned to the class than when they have the regular high-school teacher alone. It is commonly recognized that dull pupils are more difficult to teach than the brighter ones. They require more individual help from the teacher and more attention given by the teacher to their special difficulties. One reason for the better results is that there is more likelihood that extra attention and help will be given to these pupils whenever they have a student teacher than when they do not, for the simple reason that then they have in reality two teachers to check upon their learning difficulties. During the period set aside for supervised study two teachers—the critic teacher and the student teacher—are available to render assistance. Likewise, at the end of the school day, in the half-hour period set aside for rendering individual instruction for those who, in the critic teacher's judgment, need it, there is more likelihood of the slow learners' being called in because a student teacher is there to help the critic teacher. A student teacher is present to act as an assistant, thus extending the critic

TABLE 5
STATISTICAL DATA FOR UPPER AND LOWER QUANTILES

	Experimental	Control	Obtained Difference (Experimental-Control)	σ Diff.	Critical Ratio	Level of Confidence
Number of pupils.....	947	947	.....	...	...	...
Q_1 initial T-scores.....	39.17 $\pm$.43†	39.38 $\pm$.43	— .21 (in favor of control)	...	...	...
Q_3 initial T-scores.....	52.26 $\pm$.43	52.35 $\pm$.43	— .09 (in favor of control)	...	...	...
Mean initial T-scores.....	45.66 $\pm$.32	45.77 $\pm$.32	.....	...	...	...
Standard deviation of initial T-scores.....	9.95	9.90	.....	...	...	...
Q_1 final T-scores*.....	44.30 $\pm$.43	43.06 $\pm$.49	1.24 (in favor of experimental)	.43	2.88	.01
Q_3 final T-scores.....	58.73 $\pm$.43	58.23 $\pm$.49	.50 (in favor of experimental)	.43	1.17	.24
Standard deviation of final T-scores.....	10.70	11.40	.....	...	...	...

* Correlation between final T-scores: .61 (experimental and control).

† Standard error.

teacher's opportunity to serve. Another reason for the significantly better results with slow or dull high-school pupils when a student teacher has been assigned to a class is the emphasis placed upon remedial instruction in the joint critic and student teacher group conferences and in the other phases of the supervision afforded.

The common testimony of critic teachers is that they themselves become much more conscious of learning difficulties whenever they are assigned a student teacher. They have told the University supervisor that this is due to the fact that they are not only stimulated by the supervision provided, but also feel the responsibility of teaching a beginner how to give extra attention to pupils who find it difficult to learn. This testimony affords a third reason for the better results obtained with slow pupils.

The explanation given above is no doubt sufficient to account for the superior achievement which the lower-than-average pupils enjoyed under supervised student teachers. It should not be overlooked, however, that there were probably other factors of a psychological nature which may have a considerable influence. Pupils who are below average often build up an unfavorable attitude toward their teachers which is not conducive to effective learning. They are inclined to associate their lack of interest in the subject, or their lack of effort in trying to master it, to the fact that they do not like the teacher. They welcome a change in teachers and with the change are stimulated to do better work. A young teacher with the attitude of a learner himself, with no previously built-up prejudices against the slow pupils, challenges them to make a fresh start and to renew their effort—especially if the young teacher is sympathetic and willing to help them. A great change is likely to occur in the pupils' attitude affecting motivation and the desire to learn because a new teacher has come into the classroom. And the very fact that the teacher is young may have considerable influence. "Youth appeals to youth," said a wise psychologist and educator upon being apprised of these results, "not only in the social world but also in the classroom."

While such factors no doubt contributed to the better achievement which the supervised student teachers attained with the relatively slow learners, sober judgment dictates that the chief reason was the type of supervision provided, which emphasized the importance of remedial instruction. It emphasized giving as much attention as possible to the individual in the classroom and to analyzing difficulties in learning. Under this stimulus critic teachers themselves became more interested than usual in "bringing all up to the average of the class." Slower pupils naturally received more attention than they usually received,

not only during the recitation or discussion period, but in supervised study and in the special coaching period at the end of the school day. The slow learner had not only more time in which there was constantly a teacher at his elbow to guide him in his difficulties and to render assistance, but he had a great deal more individual attention and sympathetic understanding than he ordinarily received. We then have a combination of factors which taken together may serve to explain one of the more important results found in this investigation, namely, that supervised student teachers obtain better results with lower-than-average or slow high-school pupils than do the regular teachers.

The seventy-fifth percentile. The upper level of the average group, as indicated by Q_3 , likewise tends to achieve more under supervised student teachers than under the regular teachers. The difference is not so marked as for Q_1 , but nevertheless the chances are in favor of the group at this level taught by supervised student teachers achieving better results than under the regular teachers.

Examination of the entries in Table 5 shows that, on the initial achievement tests, Q_3 for the control group was slightly higher (52.35 as compared with 52.26) than for the experimental group. When we look at the entries for Q_3 on the final tests, we notice that Q_3 is higher for the experimental group—58.73 for the experimental group and 58.23 for the control group. The experimental group gained 6.35 points on the T-scale, whereas the control group gained considerably less, namely, 5.61 points. The difference obtained for Q_3 on the final tests between the two groups is .50. This difference divided by the standard error of the difference (critical ratio) equals 1.17. A critical ratio of this magnitude is not sufficiently large to indicate that the null hypothesis can be rejected. Since the difference is not statistically significant, we cannot say that all other similarly selected samples would show that the brighter pupils do better work under supervised student teachers, but we can say that the chances are high that they do. That the brighter pupils do just as well when taught by supervised student teachers as when taught by the regular teachers and are likely to do better is a conservative deduction from the data.

The explanation for this creditable showing by the supervised student teachers with pupils above average may be due to the type of supervision which stresses the policy of individualizing instruction. This is not limited to the ability of pupils below average in achievement but, on the contrary, consists in encouraging voluntary projects on the part of the more gifted, interested, and able pupils.

SUMMARY

Comparison in achievement was made between two large groups of nearly one thousand pupils each. The groups were carefully paired on the basis of initial achievement and general intelligence. The experimental factor introduced was teaching by supervised student teachers. All other factors were the same for both groups. The paired groups were again tested at the end of the supervised student teaching period consisting of seven weeks. The differences were obtained for the mean, Q_1 , and Q_2 for each group between the final scores. The differences obtained were all in favor of the group taught by supervised student teachers. The differences for the mean and Q_3 were not statistically significant, but the chances were found to be high for the latter that pupils taught by supervised student teachers will do better school work than when they are taught by the regular teachers. The difference obtained for Q_1 was found to be statistically significant since the difference obtained was practically three times the standard error of the difference. This may be interpreted to mean that supervised student teachers from Purdue University usually secure better results with the lower-than-average pupils than do the regular teachers. So long as the supervision and the other factors effecting the outcome of the experiment remain constant, there is no reason to believe that the same results would not be obtained with every group of Purdue supervised student teachers in the academic subjects.

The educational significance of these findings is that it is now proved with facts that high-school pupils taught by supervised student teachers from Purdue University do not learn less than they do ordinarily under the regular classroom teachers. Moreover, on the positive side, proof is established that lower-than-average or dull pupils are actually benefited from the experience of having student teachers as instructors, since it has been shown that they learn more when student teachers are assigned. The superintendents in the co-operating public schools now have valid statistical evidence which, taken as a whole, shows that high-school pupils are not harmed by having student teachers assigned to teach in the high schools under the type of supervision provided. Indeed, the slower pupils are aided in learning by this arrangement. Strictly speaking, these findings apply only to the population from which the sample was taken, namely, pupils taught by student teachers from Purdue University; but it not not unlikely that in other situations having a similar type of organization for supervising student teachers, similar results would be obtained. Wider significance may be attached to these results if they are verified in other schools.

CHAPTER III

ANALYSIS OF PUPIL ACHIEVEMENT

In this chapter pupil achievement in each of the five semesters and nine subject-matter areas will be discussed. The results for each of the five semesters the experiment was in progress will be discussed first. Later in the chapter the findings for each of the subject-matter areas in which student teachers worked will be presented. Since the experiment was conducted in exactly the same way each semester, it may be said that the results obtained from one semester serve as a check upon those obtained in any other. As has been said, in a sense the same experiment was conducted five times.

All experimental conditions were held the same, or as nearly the same as possible, each semester. Except that there was of necessity a change in student teachers and to some extent a change in pupils, there was little or no difference in the experimental conditions from one semester to another. Common elements may be listed as follows: First, there was the same supervisory program each semester. Second, the length of time between the initial and final tests was the same, seven weeks. Third, there were the same tests or equivalent forms of the same tests, the same testing conditions, the same treatment of the data, the same schools and school administration, and the same design or plan for the experiment.

RESULTS OF THE FIRST EXPERIMENT

(FIRST SEMESTER, 1935-36)

Six individuals (seniors in the School of Science) obtained their experience as supervised student teachers this semester. These student teachers taught 137 pupils, 99 of whom could be matched on the basis of initial T-score and I.Q. with the same number of pupils enrolled in other sections or class groups. The six student teachers taught in three different subject groups. Two had classes in English 10B, two in American history, and two in algebra.

In Table 6 the results for each semester are shown. It will be observed in the first place that the two groups in the first experiment have been evenly matched in respect to initial achievement and I.Q. A slight advantage is held by the experimental group in both initial achievement and I.Q. over the control group, but these differences

TABLE 6

COMPARATIVE ACHIEVEMENT OF EXPERIMENTAL AND CONTROL GROUPS FOR FIVE SEMESTERS

Experiment 1	Experimental	Control	Obtained Difference (Experimental-Control)	σ Diff.	Critical Ratio	Level of Confidence
No. of pupils (first sem. 1935-36)	99	99	.....	...	...	...
Mean initial T-scores	46.59 $\pm$.88	46.39 $\pm$.86	.20 (in favor of experimental)	...	...	...
S. D. of initial T-scores	8.85	8.55	.....	...	...	...
Mean I. Q.	105.84 $\pm$.97	105.23 $\pm$.92	.61 (in favor of experimental)	...	...	...
S. D. of I. Q's	9.63	9.20	.....	...	...	...
Mean final T-scores	50.43 $\pm$.85	48.97 $\pm$.82	1.46 (in favor of experimental)	.69	2.12	.04
S. D. of final T-scores	8.50	8.15	.....	...	...	...
Experiment 2						
No. of pupils (second sem. 1935-36)	402	402	.....	...	...	...
Mean initial T-scores	46.28 $\pm$.46	46.45 $\pm$.46	— .17 (in favor of control)	...	...	...
S. D. of initial T-scores	9.25	9.19	.....	...	...	...
Mean I. Q.	102.65 $\pm$.56	102.93 $\pm$.54	— .28 (in favor of control)	...	...	...
S. D. of I. Q's	11.23	10.80	.....	...	...	...
Mean final T-scores	50.50 $\pm$.49	50.73 $\pm$.51	— .23 (in favor of control)	.39	.59	.56
S. D. of final T-scores	9.80	10.20	.....	...	...	...
Experiment 3						
No. of pupils (first sem. 1936-37)	129	129	.....	...	...	...
Mean initial T-scores	43.63 $\pm$.75	43.74 $\pm$.74	— .11 (in favor of control)	...	...	...
S. D. of initial T-scores	8.55	8.40	.....	...	...	...
Mean I. Q.	105.26 $\pm$.89	104.71 $\pm$.95	.55 (in favor of experimental)	...	...	...
S. D. of I. Q's	10.15	10.80	.....	...	...	...
Mean final T-scores	48.00 $\pm$.79	49.16 $\pm$.89	— 1.16 (in favor of control)	.83	1.39	.17
S. D. of final T-scores	8.95	10.15	.....	...	...	...

TABLE 6 (Continued)
COMPARATIVE ACHIEVEMENT OF EXPERIMENTAL AND CONTROL GROUPS FOR FIVE SEMESTERS

Experiment 4	Experimental	Control	Obtained Difference (Experimental-Control)	σ Diff.	Critical Ratio	Level of Confidence
No. of pupils (second sem. 1936-37)	179	179	.....	...	...	...
Mean initial T-scores	45.10 $\pm$.84	45.30 $\pm$.83	— .20 (in favor of control)	...	...	...
S. D. of final T-scores	11.20	11.15	.....	...	...	...
Mean I. Q.	106.50 $\pm$.81	106.15 $\pm$.72	.35 (in favor of experimental)	...	...	...
S. D. of I. Q's.	10.82	9.68	.....	...	...	...
Mean final T-scores	50.58 $\pm$.87	52.93 $\pm$ 1.01	—2.35 (in favor of control)	.92	2.56	.02
S. D. of final T-scores	11.63	13.65	.....	...	...	...
Experiment 5						
No. of pupils (second sem. 1937-38)	138	138	.....	...	...	...
Mean initial T-scores	45.73 $\pm$.97	45.84 $\pm$.99	— .11 (in favor of control)	...	...	...
S. D. of initial T-scores	11.45	11.60	.....	...	...	...
Mean I. Q.	104.83 $\pm$.87	105.33 $\pm$.83	— .50 (in favor of control)	...	...	...
S. D. of I. Q's.	10.25	9.80	.....	...	...	...
Mean final T-scores	56.13 $\pm$ 1.02	54.75 $\pm$ 1.16	1.38 (in favor of experimental)	.98	1.40	.17
S. D. of final T-scores	12.00	13.60	.....	...	...	...

were found not to be statistically significant. The standard deviations in both of the factors mentioned also agree closely, although the experimental group is somewhat more variable. The end results show that the experimental group has a higher mean score than the control group (50.43 as compared with 48.97). The experimental group increased its mean score by 3.84 points (50.43—46.59) and the control group by 2.58 points on the T-scale. The observed difference between the two mean final T-scores was 1.46, which difference, when evaluated for its reliability, yields a critical ratio of 2.12. This difference is large enough to indicate that statistical significance had been attained at the 4 per cent level. It is, therefore, with a high degree of confidence that we may reject the hypothesis that there was no real difference in achievement, or that chance alone is responsible for the difference obtained in favor of the student teachers. Certainly the pupils were not harmed by having supervised student teachers for instructors this semester. On the contrary, the evidence at hand indicates that they were benefited.

RESULTS OF THE SECOND EXPERIMENT

(SECOND SEMESTER, 1935-1936)

During the second semester of 1935-36, 486 pupils were taught by supervised student teachers, of whom 402 could be paired with a corresponding number taught by regular teachers. They were paired in exactly the same manner as described in the preceding section. These pupils were taught by twenty-three student teachers from a total of twenty-four who enrolled. One was excluded from the experimental study because the final test was not given at the scheduled time. Of the twenty-three student teachers whose pupils were measured for gains in achievement, nine taught classes in English, four in American history, three in arithmetic, two in algebra, one in plane geometry, two in civics, one in economics, and one in biology. Fifteen of these student teachers taught at Jefferson High School and eight at the West Lafayette High School.

The mean initial T-scores for Experiment 2 (see Table 6) indicate that the groups were well matched in respect to achievement. What advantage there is, is in favor of the control group. Likewise, in I.Q. the control group has even a slightly better advantage over the experimental group. Both the experimental and control groups made about the same gain in achievement between initial and final tests. The experimental group gained 4.22 points (50.50—46.28) and the con-

trol group 4.28 points (50.73—46.45). The difference between the final mean scores was .23 in favor of the control group. This small difference is not statistically significant. The critical ratio is only .59, which indicates that in 56 per cent of similar samples a difference no larger than the one obtained would be found. Since the difference obtained in favor of the control group may be due to chance, it may be assumed that both the experimental and control groups made the same amount of progress. In other words, the pupils were not harmed by having student teachers as instructors.

RESULTS OF THE THIRD EXPERIMENT

(FIRST SEMESTER, 1936-1937)

In this semester eleven student teachers were enrolled in the course. The testing program was carried out for all of them according to plan, and the records of all could be used in the evaluation of achievement. These student teachers taught 246 pupils, 129 of whom could be paired with pupils in other sections of the same classes taught by regular teachers. The pairing was done in exactly the same manner as for each of the other semesters. In this group of student teachers four taught English, four history (three American history and one world history), one civics, one biology, and one elementary algebra. Eight of the student teachers taught at Jefferson High School and three in the West Lafayette High School.

Examination of the data summarized in Table 6 for the third experiment reveals that the groups have again been closely matched in respect to initial achievement scores and I.Q.'s. The data show that the control group has a slight advantage in initial achievement and the experimental group in the mean I.Q. The difference between the mean final T-scores, 1.15, is in favor of the control group. When, however, this difference was evaluated for its statistical significance, it was found that the null hypothesis could be rejected only at the 17 per cent level of confidence. Since this is far beyond the 5 per cent level, usually taken to indicate statistical significance,¹ it may be assumed that no difference in achievement has been found. In other words, the difference obtained, although in favor of the control group, was not large enough to indicate any real difference in learning or achievement between pupils taught by supervised student teachers and pupils taught by the regular classroom teachers. Each group achieved approximately the same amount. Again the results indicate that the pupils were not harmed by being taught by student teachers.

¹ Peters and Van Voorhis, *op. cit.*, p. 176.

RESULTS OF THE FOURTH EXPERIMENT

(SECOND SEMESTER, 1936-1937)

Sixteen student teachers were enrolled in the course this semester, fifteen of whom were employed in the experiment. One taught a class in health and safety, a course for which no suitable test was available. This teacher was therefore omitted from the experiment. Of the fifteen student teachers whose pupils were measured for gains in achievement, three taught American history, two English (one in grammar and composition and the other reading and appreciation of literature), two elementary algebra, two civics, two chemistry, one plane geometry, one world history, one biology, and one German. These student teachers taught 347 pupils, 179 of whom could be paired with pupils in other sections of the same classes. Nine of the student teachers taught at Jefferson High School and six at the West Lafayette High School. The results of this semester (Experiment 4) are shown in Table 6.

It will be observed that the two groups have again been closely matched. The control group has a slight advantage in the mean initial T-score, but the experimental group has a corresponding advantage in the mean I.Q. The control group in this experiment made the larger gain. The experimental group increased its mean score from 45.10 to 50.58, or 5.48 points, and the control group 7.63 points on the T-scale. The difference obtained between the final T-score means was 2.35 in favor of the control group. This difference is statistically significant at the 2 per cent level of confidence, indicating that the group taught by the regular classroom teachers did better work. The results for this semester are in contrast with those obtained in the first experiment in which a difference almost as large was found in favor of the group taught by supervised student teachers.

RESULTS OF THE FIFTH EXPERIMENT

(SECOND SEMESTER, 1937-1938)

Fourteen student teachers were enrolled in the supervised student teaching course this semester. One of them was excluded from the experiment because of incomplete records of two sections taught by regular teachers. This made it impossible to find pupils who could be paired in the same subject with the student teacher's pupils. From the records of the thirteen student teachers whose pupils could be used, 138 pupils were matched from a total of 281 pupils taught. There were six student teachers in English (four of whom had

classes in reading and appreciation of literature and two in grammar and composition), four in American history, one in world history, one in biology, and one in plane geometry. Nine of the student teachers employed in the study taught classes in Jefferson High School and four at the West Lafayette High School.

The results are shown in Table 6 in the section labeled Experiment 5. Examination of the data shows that the two groups have been evenly matched in initial achievement as indicated both by the mean and the standard deviation. The same is true with the I.Q. except that the control group, according to its smaller standard deviation, is more closely grouped about the mean than the experimental group. The control group is, therefore, more homogeneous than the experimental. Although the initial differences are not statistically significant, the control group possesses a slight advantage in both initial achievement and I.Q. as well as greater homogeneity. When, however, the groups were compared at the end of the training period for student teachers, it was found that this pattern was reversed.

The experimental group made the greater gain. It increased its mean T-score from 45.73 to 56.13, or 10.40 points, whereas the control group gained considerably less, 8.89 points. The difference between the final T-scores was 1.38 points on the T-scale. This difference is statistically significant at the 17 per cent level, which is of course too low for us to reject the null hypothesis. In other words, the difference obtained this time in favor of the experimental group may be considered as a chance difference just as it was in Experiment 3 when a difference of the same size was found in favor of the control group. In this experiment it was again demonstrated that the pupils learned just as much under supervised student teachers as under the regular teachers. This was the last time the experiment was conducted. Repetition of the experiments produced results which verify the conclusion that pupils in the long run learn just as much under supervised student teachers as when taught by the regular high-school teachers.

COMPARISON OF RESULTS IN VARIOUS SUBJECT-MATTER AREAS

Analysis of achievement may be considered further by comparing gains made according to subjects taught by student teachers. In comparing the achievement of pupils taught by supervised student teachers with that of pupils taught by regular teachers, the questions at once arise in the mind of the inquiring student: "What, if any, are the differences in the various subject-matter fields?" "Is it possible that

supervised student teachers from a given institution under the same general type of supervision will do better relatively in some subject-matter areas than in others?" In order to answer these questions, an analysis will now be made of the various subject-matter fields in which supervised student teaching was done.

The data for this phase of the study are given in Table 7. The data have been arranged according to the number of pupils in each subject. The subject containing the largest number of pupils is presented first, followed by the next largest, and so on in descending order. As shown in Table 7, there were nine subject-matter areas in which supervised student teaching was measured from the viewpoint of its effect upon the achievement of the pupils. The largest and therefore the first to be presented is English. There were 319 paired pupils in this subject-matter group who were taught by twenty-three supervised student teachers. The second in order is American history, with 239 paired pupils taught by sixteen student teachers. The third is social studies in courses other than history, consisting of classes in civics and economics. There were 98 paired pupils in this group taught by five supervised student teachers. The fourth is algebra, with 86 paired pupils taught by seven student teachers. The remaining groups are smaller, consisting first of arithmetic with 50 paired pupils taught by three student teachers. This group has fifth place in the order of presentation. The sixth is world history, consisting of 39 matched pairs of pupils who were taught by three supervised student teachers. The seventh is chemistry, taught by three supervised student teachers and consisting of 38 pupils in each group. The eighth is biology, consisting of 37 paired pupils taught by four supervised student teachers; and the ninth and last is plane geometry, which consists of 35 paired pupils taught by three supervised student teachers. The list above accounts for 67 of the student teachers and 941 of the pupils.

Inspection of the data in Table 7 shows that, with the exception of chemistry, each group is equivalent in knowledge of the subject and I.Q. at the beginning of the experiment. In the process of pairing the pupils the mean initial differences were evaluated for statistical significance, but none was found except in chemistry. In this subject the difference in initial knowledge between the experimental and control groups is statistically significant. It is in favor of the experimental group. The experimental group is still ahead at the end of the experiment in this subject, but at the 6 per cent rather than the 1 per cent level of confidence. The inequality of the chemistry group in initial achievement is offset, to some extent at least, by the con-

TABLE 7
COMPARATIVE ACHIEVEMENT OF EXPERIMENTAL AND CONTROL GROUPS IN NINE SUBJECT-MATTER AREAS

Subject	Experimental	Control	Obtained Difference (Experimental-Control)	σ Diff.	Critical Ratio	Level of Confidence
<i>English</i>						
No. of pupils.....	319	319	.....	—		
Mean initial T-scores	49.22±.44	49.13±.44	.09 (in favor of experimental)	...	...	...
S. D. of initial T-scores.....	8.85	8.55	.....	...	...	...
Mean I. Q.	104.67±.61	104.71±.57	— .04 (in favor of control)	...	...	...
S. D. of I. Q's.....	10.97	10.14	.....	...	...	...
Mean final T-scores	52.38+.49	52.97±.51	— .59 (in favor of control)	.45	1.32	.19
S. D. of final T-scores.....	8.81	9.05	.....	...	...	...
<i>American History</i>						
No. of pupils	239	239	.....	...	...	...
Mean initial T-scores	42.99±.77	43.08±.77	— .09 (in favor of control)	...	...	...
S. D. of initial T-scores	11.89	11.96	.....	...	...	...
Mean I. Q.	105.65±.62	104.91±.60	.74 (in favor of experimental)	...	...	...
S. D. of I. Q's.....	9.61	9.31	.....	...	...	...
Mean final T-scores	51.56±.93	53.22±1.02	—1.66 (in favor of control)	.88	1.90	.06
S. D. of final T-scores.....	14.37	15.72	.....	...	...	...

Civics and Economics

No. of pupils.....	98	98	.....	.....	.....	.....
Mean initial T-scores.....	43.80±.97	43.87±.95	— .07 (in favor of control)	.....	.....	.....
S. D. of initial T-scores.....	9.57	9.36	.....	.....	.....	.....
Mean I. Q.....	106.16±1.18	105.09±1.00	1.07 (in favor of experimental)	.....	.....	.....
S. D. of I. Q's.....	11.64	9.90	.....	.....	.....	.....
Mean final T-scores.....	48.79±.92	48.89±.98	— .10 (in favor of control)	.775	.13	.90
S. D. of final T-scores.....	9.12	9.72	.....	.....	.....	.....

Algebra

No. of pupils.....	86	86	.....	.....	.....	.....
Mean initial T-scores.....	46.36±.82	46.36±.81	.....	.....	.....	.....
S. D. of initial T-scores.....	7.60	7.54	.....	.....	.....	.....
Mean I. Q.....	104.68±.94	105.49±.94	— .81 (in favor of control)	.....	.....	.....
S. D. of I. Q's.....	8.74	8.71	.....	.....	.....	.....
Mean final T-scores.....	51.45±.94	47.93±.88	3.52 (in favor of experimental)	.59	5.96	.01
S. D. of final T-scores.....	8.76	8.13	.....	.....	.....	.....

Arithmetic

No. of pupils.....	50	50	.....	.....	.....	.....
Mean initial T-scores.....	45.26±1.01	45.30±.99	— .04 (in favor of control)	.....	.....	.....
S. D. of initial T-scores.....	7.14	7.05	.....	.....	.....	.....
Mean I. Q.....	94.50±1.31	93.54±1.35	.96 (in favor of experimental)	.....	.....	.....
S. D. of I. Q's.....	9.30	9.57	.....	.....	.....	.....
Mean final T-scores.....	49.32±1.23	51.30±1.19	— 1.98 (in favor of control)	.75	2.64	.01
S. D. of final T-scores.....	8.73	8.40	.....	.....	.....	.....

TABLE 7 (Continued)

Subject	Experimental	Control	Obtained Difference (Experimental-Control)	σ Diff.	Critical Ratio	Level of Confidence
<i>World History</i>						
No. of pupils.....	39	39	.....	...	...	...
Mean initial T-scores.....	45.23 $\pm$ 1.14	45.08 $\pm$ 1.18	.15 (in favor of experimental)	...	...	...
S. D. of initial T-scores.....	7.11	7.38	.....	...	...	...
Mean I. Q.	103.08 $\pm$ 1.21	102.84 $\pm$ 1.40	.24 (in favor of experimental)	...	...	...
S. D. of I. Q's.....	7.53	8.76	.....	...	...	...
Mean final T-scores.....	47.70 $\pm$ 1.22	48.78 $\pm$ 1.36	-1.08 (in favor of control)	1.17	.92	.25
S. D. of final T-scores.....	7.62	8.49	.....	...	...	...
<i>Chemistry</i>						
No. of pupils.....	38	38	.....	...	...	...
Mean initial T-scores.....	49.50 $\pm$ 2.19	47.28 $\pm$ 2.31	2.22 (in favor of experimental)	(.65)	(3.03)	(.01)
S. D. of initial T-scores.....	13.50	14.22	.....	...	...	...
Mean I. Q.	107.85 $\pm$ 1.61	109.26 $\pm$ 1.18	-1.41 (in favor of control)	...	...	...
S. D. of I. Q's.....	9.90	7.29	.....	...	...	...
Mean final T-scores.....	53.85 $\pm$ 2.05	52.74 $\pm$ 2.04	1.11 (in favor of experimental)	.58	1.91	.06
S. D. of final T-scores.....	12.66	12.60	.....	...	...	...

Biology

No. of pupils.....	37	37	.....	.....	.....	.....
Mean initial T-scores.....	41.19±.41	40.95±1.33	.24 (in favor of experimental)	.....	.....	.....
S. D. of initial T-scores.....	8.67	8.05	.....	.....	.....	.....
Mean I. Q.....	101.19±2.66	102.96±2.71	—1.77 (in favor of control)	.....	.....	.....
S. D. of I. Q's.....	16.17	16.47	.....	.....	.....	.....
Mean final T-scores.....	44.10±1.53	45.33±1.88	—1.23 (in favor of control)	1.43	.86	.39
S. D. of final T-scores.....	9.33	11.44	.....	.....	.....	.....

Plane Geometry

No. of pupils.....	35	35	.....	.....	.....	.....
Mean initial T-scores.....	39.12±.89	39.09±.88	.03 (in favor of experimental)	.....	.....	.....
S. D. of initial T-scores.....	5.31	5.22	.....	.....	.....	.....
Mean I. Q.....	105.12±1.84	104.49±1.72	.63 (in favor of experimental)	.....	.....	.....
S. D. of I. Q's.....	10.89	10.20	.....	.....	.....	.....
Mean final T-scores.....	50.58±1.33	48.84±1.36	1.74 (in favor of experimental)	1.29	1.35	.18
S. D. of final T-scores.....	7.86	8.04	.....	.....	.....	.....

siderable superiority of the control group in general intelligence. The mean I.Q. of the control group was 109.26 as compared with 107.85 for the experimental. For all the other subjects the experimental and control groups were equivalent in respect to both the I.Q. and initial status in the quantity measured.

Examination of the final results, obtained after seven weeks of teaching by student teachers, shows that gains were made in all subjects. The greatest gain was made in plane geometry, in which the experimental group gained 11.46 points on the T-scale, and the control group 9.75 points. The smallest gain by the control group was in algebra, 1.57 points. In the same period of time the experimental group gained 4.09 in this subject. The smallest gain made by the experimental group was 2.47 points. This was in world history. For the control group the gain in world history was 3.70 points.

In six of the nine subjects the obtained differences were in favor of the control groups. However, all the differences in favor of the control groups were statistically insignificant except in arithmetic. In this subject the difference was significant at the 1 per cent level. In American history also the control group made a larger gain relatively than the experimental group. The difference was significant at the 6 per cent level. However, since the difference was not significant at the 5 per cent level—the level we have chosen for rejecting the null hypothesis—we shall not, in order to be consistent, consider it a significant difference.²

In three of the subjects, pupils taught by the supervised student teachers obtained higher results than those taught by the regular teachers. It is interesting to note that these subjects, namely, algebra, plane geometry, and chemistry, are all technical subjects. Since Purdue University is a technical institution, the results favorable to the student teachers in these subjects are not surprising. They are in harmony with that which one should expect. Student teachers who have completed the requirements for a teacher's certificate in these subjects at Purdue have demonstrated that they know the subject they expect to teach. For one subject, algebra, the difference obtained is highly significant. The difference in chemistry is significant at the 6 per cent level, and in plane geometry it is significant at the 18 per cent level. All of them rank among the highest levels of significance found in any of the subjects.

In general, however, the findings reported in Table 7 show that in most of the subjects there was no real difference in achievement

² E. F. Lindquist, *Statistical Analysis in Educational Research*, p. 16. Chicago: Houghton-Mifflin Company, 1940.

between the experimental and control groups. In seven of the nine subjects the differences were not considered great enough to show conclusively that one group did better work than the other. Thus, in English, American history, civics and economics, world history, chemistry, biology, and plane geometry, the differences obtained may have been due to chance, and therefore it must be assumed that the null hypothesis has been sustained. In other words, in these subjects, which constitute seven-ninths of the total, the results of the experiment indicate that pupils taught by student teachers learned just as much about the subject as those taught by the regular teachers. Only in algebra and arithmetic were the differences found to be statistically significant. Each was significant at the 1 per cent level. Since the first was in favor of the experimental group and the second in favor of the control, and since both subjects are in the general field of mathematics, a discussion of possible causes for these differences is desirable.

Subjects in which a significant difference was found. In no subject except algebra was the obtained difference three or more times the standard error of the difference. In this subject it was 5.64 times. This difference, which was in favor of the experimental group, indicates that something happened that cannot be attributed to chance. The results indicate that pupils who are taught algebra by student teachers under the supervision provided learn more than when taught by the regular teachers. One reason for this is that student teachers at Purdue University who have completed a sufficient number of courses in mathematics to be admitted to the course in student teaching in their senior year must have three-fifths of their grades equal to 4 or better in the subject-matter field in which they expect to do their practice teaching. The requirements or standards in the mathematics department at Purdue are high. Therefore, a senior who has three-fifths or more of his marks equal to or better than mark 4 is a good student in a difficult subject. His scholarship in mathematics is distinctly above average. The same rule for admittance to student teaching applies, of course, to other subjects; but because of the selective character of mathematics, students in this subject are more likely to be superior in knowledge of the subject than those in history or English, for example.

Perhaps a reason just as important as the one discussed in the paragraph above is the way in which the portion of the class hour reserved for directing the pupils' study was utilized. In algebra the critic teachers assisted the student teachers in checking the pupils' problems and in advising pupils individually on the correct methods

to use in solving problems and in studying the subject. In effect, then, pupils in algebra classes had the benefit of a greater amount of individual instruction in classes having a student teacher than they could have had from one teacher. Critic teachers in algebra did not teach the class when they had a student teacher, but they did assist the student teacher during the supervised study periods. In view of the superior results which pupils in the experimental group in algebra achieved, it appears that this practice is eminently worth while.

Algebra was the only subject in which both the critic teachers and the student teachers supervised the pupils' study. It is reasonable to believe that if the supervised study periods in all subjects having practice teachers had been utilized as effectively as they were in algebra, superior results might have been obtained by the experimental group in more subjects than was actually the case. If this be true, then pupils to whom a student teacher has been assigned are benefited for the reason that extra attention to individual difficulties in mastering a subject is made possible. It is strongly recommended, therefore, that critic teachers in other subjects make similar use of student teachers in directed study periods.

The success of student teachers in algebra finds a sharp contrast in the relative failure of student teachers in arithmetic. The difference in arithmetic is in favor of the control group. It is significant at the 1 per cent level. Why is it that student teachers who had successfully met the same high standards of the mathematics department as the student teachers in algebra should fail to get as good results in arithmetic? Several explanations may be offered. One is that the student teachers, although good in mathematics, have need of a good review course in arithmetic as a part of their preparation for teaching. Applicants for a high-school teacher's certificate in mathematics are not required to produce college credit in arithmetic. When it is remembered that the college-entrance-type course in high school does not usually include the subject either, it is readily understood that student teachers may not be as familiar with the processes of arithmetic as they should be for efficient teaching. Moreover, studies previously conducted on the relative effectiveness of student teaching agree that student teachers tend to be relatively weak in drill subjects.³ This subject, adapted as it was to dull pupils, was definitely of

³ G. N. Cade and W. S. Gray, "Objective Studies of the Achievement of Training-School and Public-School Pupils in the Freshman Year of High School," *The Elementary School Journal*, XIX (December, 1918), 291-310. Also W. S. Learned and W. C. Bagley, *The Professional Preparation of Teachers for American Public Schools*. Bulletin No. 14, p. 209. New York: Carnegie Foundation for the Advancement of Teaching, 1920.

the drill type. The I.Q. of the pupils in arithmetic was the lowest of any of the groups (see Table 7). Experienced critic teachers testify that student teachers in mathematics are at their weakest in procedures requiring drill.⁴ Student teachers in arithmetic, then, worked under a distinct disadvantage. They did not have recent experience as students in the subject which they were asked to teach, and they had dull pupils who required expertness in drill procedures.

Based upon the writer's intimate knowledge of the situation, acquired by visiting each class at least once per week and often twice, a third reason may be added. Efficient use of the supervised study period was not in evidence in arithmetic. The critic teachers in arithmetic did not assist the student teachers in the supervised study period as they did in algebra. The value to be derived from having two teachers in the supervised study period was, therefore, not realized in the arithmetic classes. Little was expected of the student teacher during the portion of the class hour reserved for study except that he maintain reasonably good control or discipline over the pupils in a situation intended for study. Moreover, the critic teachers in arithmetic had not perfected the technique of individualizing instruction themselves to the extent that the critic teachers in algebra had done. As a result, the advantage of having two teachers in the room, thus increasing the opportunity to individualize instruction in supervised study periods, was largely lost. Ineffective use of student teachers in individualizing instruction alone may be sufficient to explain the lack of success of student teachers in arithmetic, as compared with their marked success in algebra. In view of the contributing factors enumerated above, it is unlikely that better results could have been forthcoming in arithmetic.

SUMMARY

In this chapter comparisons were made between paired pupils taught by supervised student teachers and regular teachers for five semesters and for subject-matter groups in nine areas. The results showed that in no semester was there a difference as high as the 1 per cent level of significance between the means of the final scores. There were fluctuations in relative achievement from one semester to another, but in no semester was there a sufficiently large difference to justify the conclusion that with other samples either the experimental or the control group would always be ahead. If the null

⁴ George S. Kenzler and Clarence Lane, critic teachers in mathematics, in unpublished critic teachers' reports on file in the Division of Education and Applied Psychology, Purdue University.

hypothesis is rejected at the 5 per cent level of significance, then there were two semesters in which definitely superior results were obtained. The results from the first and fourth experiments are statistically significant at a higher level of confidence than 5 per cent. One of these, the first, was in favor of the experimental group; and the other, the fourth, was in favor of the control group. These results probably indicate that differences in the effectiveness of teaching occurred during the semesters these measurements were taken. However, since one difference is in favor of the experimental group and the other in favor of the control, it appears that in the long run these differences would tend to balance each other.

There were six subjects, English, American history, civics and economics, arithmetic, world history, and biology, in which pupils taught by the regular high-school teachers obtained slightly higher scores on the average than pupils taught by supervised student teachers. There were, on the other hand, three subjects—all in the technical field—in which the differences obtained were in favor of the groups taught by student teachers.

Although more of the obtained differences were in favor of the control groups, it cannot be said that the evidence shows that the regular teachers actually achieve better results in more subjects than student teachers. The difference obtained in their favor may have been due to chance. With but two exceptions, the differences between the experimental and control groups were too small to be considered statistically significant. The exceptions were both in the field of mathematics. In algebra and arithmetic the differences were highly significant—that is, at the 1 per cent level. The former was in favor of the experimental, and the latter in favor of the control group. These differences were explained as probably due (1) to better preparation of the student teachers to teach algebra than arithmetic and (2) to better supervised study conditions in algebra than in arithmetic. If the same supervised study conditions had existed in all subjects as in algebra, it is likely that better results would have been obtained for the pupils taught by student teachers. Since it is possible for critic teachers to make use of student teachers in this manner, it is recommended that they do so. In general, however, under present conditions, it may be said that the evidence indicates that in most subjects there is not much difference between the experimental and control groups in the matter of achievement, and that, therefore, as far as this major item in instruction is concerned, pupils are not harmed by having supervised student teachers assigned to teach them.

CHAPTER IV

PUPIL ACHIEVEMENT UNDER INDIVIDUAL STUDENT TEACHERS

There are at least two reasons why it is desirable to compare the achievement of pupils under individual student teachers with their respective parallel groups. The first is that treatment of the data by individual student teachers constitutes a different approach to the problem than that reported in Chapters II and III. It will be seen that approximately the same results were obtained by the two methods. A second reason is that it is possible by the latter method to identify the student teachers who did better work than the regular teachers, and in like manner to identify those who did poorer work. The student teachers who did significantly better or poorer work than the regular teachers may then be compared in respect to factors known to be associated with success in teaching.

RESULTS OBTAINED BY COMPARING CLASS GROUPS

Comparing the pupils of individual student teachers necessarily involves small samples because they are limited to the size of class groups. Moreover, the matching procedure used to control the experiment further reduced the number of pupils in each class. However, it is possible to test the reliability of the difference between the means obtained from small samples. This is accomplished by applying the t -test of the significance of the difference between the means of the related measures.¹

The use of the t -test in determining whether or not the pupils of an individual student teacher achieved statistically significant results may be illustrated by an example. For the sake of convenience we shall take the final achievement data for the paired pupils in a student teacher's class in English 10B. The complete record for this student teacher's class is shown in Plate I. (See page 28.)

The final t -scores of the 17 pairs of matched pupils are shown in the lower half of Plate I and reproduced here in Table 8. The record for any of the student teachers in the experiment would have served the purpose as well as the one presented in Table 8, since the data were recorded and the calculations made for each class group in the

¹ E. F. Lindquist, *Statistical Analysis in Educational Research*, pp. 58-59. Chicago: Houghton-Mifflin Company, 1940.

same manner; but it is desirable for the sake of clarity, as well as convenience, to illustrate the procedure with data which have been employed earlier in the study.

TABLE 8
COMPARISON OF FINAL ACHIEVEMENT TEST SCORES FOR ONE
STUDENT TEACHER IN ENGLISH 10B

Pair	Experimental	Control	Differences	d	d ²
1	62	56	+ 6	5	25
2	57	60	- 3	4	16
3	58	59	- 1	2	4
4	65	54	+11	10	100
5	54	54	0	1	1
6	64	55	+ 9	8	64
7	61	54	+ 7	6	36
8	67	54	+13	12	144
9	55	52	+ 3	2	4
10	55	62	- 7	8	64
11	31	47	-16	17	289
12	54	54	0	1	1
13	38	47	- 9	10	100
14	58	49	+ 9	8	64
15	39	43	- 4	5	25
16	49	47	+ 2	1	1
17	49	52	- 3	4	16
Means:	53.88	52.88	+ 1.00		954

As shown in Table 8 the mean difference between the experimental and control groups in this English 10B class is 1.00. This difference is not statistically significant since t equals only 0.533 for a group of seventeen pupils. By reference to Fisher's table of t , it may be determined that a value of t no larger than 0.533 would result in approximately 60 per cent of similar samples of this size.² In the example at hand the value of t at the 5 per cent level with 16 degrees of freedom ($n-1$) is 2.12. Since the value of t which we obtained from our sample is only 0.533, it is clear that the difference obtained, 1.00, in favor of the student teacher is far from significant. It may be accounted for as due to chance rather than to any real difference in achievement by pupils taught by the student teacher.

In similar manner the results for each of the sixty-seven student teachers were evaluated for statistical significance. As shown in the complete report, the t -test indicated that most of the differences were

² Lindquist, *op. cit.*, p. 53.

not significant.³ Thirty-one of the obtained differences were in favor of the student teachers' class groups and thirty-six were in favor of paired groups taught by the regular teachers. In fifty-two cases, however, the *t*-test showed that the differences were not statistically significant. In other words, it was a matter of chance whether they were in favor of the regular teachers or the student teachers.

For fifteen student teachers statistical significance was found to hold for the difference obtained. These were evenly divided between those who did better work than the regular teachers and those who did poorer work. Seven of the differences were in favor of groups taught by student teachers and eight in favor of the parallel groups taught by the regular teachers. In general, these findings are in agreement with those reported in Chapters II and III. For most of the classes, as well as for most of the pupils regardless of class groups, there was practically no difference in achievement. Almost the same number of student teachers achieved superior results as got inferior results. There were seven of the former and eight of the latter. Approximately the same number of classes were benefited by student teachers as were harmed by them. For the great majority, nearly 78 per cent, it apparently made no difference whether they were taught by supervised student teachers or regular teachers.

COMPARISON OF STUDENT TEACHERS WHO OBTAINED SIGNIFICANTLY BETTER RESULTS WITH STUDENT TEACHERS WHO OBTAINED SIGNIFICANTLY POORER RESULTS

A number of comparisons can be made between the seven student teachers who got significantly better results and the eight who got significantly poorer results. The comparisons of greatest value are those of factors known to be associated with success in teaching. Others might be made, such as those dealing with the sex of the student teacher, the influence of the age and classification of the pupils, and the influence of the subject; but these will not be discussed in the present report. In the complete study these factors were discussed.⁴ Suffice it to say here that men appear to be more variable in respect to either success or failure in student teaching than women, student teachers are less successful with high-school juniors and seniors than with freshmen and sophomores, and algebra is the best

³ Raymond R. Ryder, "Effect of Student Teaching on Secondary School Pupils in Achievement and Attitude," pp. 273-278. Doctor's dissertation, The University of Chicago, September, 1943.

⁴ Ryder, *op cit.*, pp. 132-138.

subject for success, and arithmetic the poorest, for Purdue student teachers.

Qualities which are known to accompany good teaching are enumerated in the tenth yearbook of the National Council for the Social Studies. In a summarizing statement based upon the results of research the author of the chapter entitled "The Beginning Teacher" says:

Although there may be no single criterion predictive of success, there are several well-established factors which generally accompany good teaching. At present it is safe to say that successful teachers have some of the following characteristics:

1. They are well liked by their students.
2. They have a professional interest in teaching.
3. They possess an interesting and well-adjusted personality.
4. They have the ability to co-operate in school life.
5. They usually make high marks in methods courses.
6. They had satisfactory marks in general college work.
7. They have above-average intelligence.⁵

This list of "well-established factors" may be used as criteria for comparing the student teachers who accomplished either better or poorer results than the regular teachers. The seven points listed by Michener may be conveniently telescoped into the following four general headings: (1) general intelligence, (2) scholarship, (3) personality, and (4) professional interest in teaching. The most successful student teachers were compared with the least successful in respect to each of these qualities.

Influence of general intelligence and scholarship. In order to compare the two groups of student teachers in respect to their general intelligence and scholarship, the student teachers' orientation scores, obtained at the time of their entrance to the University, and their final semester marks, were investigated. These records are classified on master cards and filed in the office of the registrar. The orientation tests consisted of (1) the National Council Psychological Examination, (2) the Purdue Placement Test in English, and (3) the Iowa Mathematics Training Test. All these scores had been converted into percentiles and were so recorded on each student's master card. The scholarship records of students who completed the requirements for graduation were also converted into percentiles and were likewise

⁵ James A. Michener, "The Beginning Teacher," *In-Service Growth of Social Studies Teachers*, p. 5. Tenth Yearbook of the National Council for the Social Studies. Cambridge, Massachusetts: The National Council for the Social Studies, 1939.

Part	Student Teacher's Number	Sex of Student Teacher	Subject Taught	National Council Psychological Exam. (Percentile)	Purdue Placement Test in English (Percentile)	Iowa Mathematics Training Test (Percentile)	Scholastic Index (Percentile)	Semester Mark in Student Teaching	Semester Mark in Special Methods	Number of Semesters a Distinguished Student	Entered Teaching Profession
A	1	M	Am. Hist. 11B...	66	68	80	61	A (5.375)	A+ (5.75)	1	Yes
	2	M	Am. Hist. 11A	40	56	26	74	A (5.375)	A- (5.00)	0	Yes
	3	F	Alg. 9B	39	65	38	55	A (5.375)	A (5.375)	0	Yes
	4	M	Econ. 12B	70	74	62	52	A+ (5.75)	A (5.375)	2	Yes
	5	F	Alg. 11B	81	80	98	96	A+ (5.75)	A+ (5.75)	8	Yes
	6	F	Eng. 9A	99	98	....	77	A+ (5.75)	A (5.375)	1	No (Lab. Tech.)
	7	M	Geom. 10B	91	59	52	51	A (5.375)	A (5.375)	0	Yes
			MEAN	69.43	71.43	59.17	66.57	5.54	5.43	1.71	
B	50	M	Civics 12A	10	21	9	4	A- (5.00)	P (3.375)	0	Yes
	56	M	Arith. 9A	33	12	54	65	A- (5.00)	A (5.375)	0	No (Farmer)
	60	F	Eng. 11A	39	74	17	41	P- (3.00)	P- (3.00)	0	No (None)
	62	F	Am. Hist. 11A	....	....	....	85	A- (5.00)	A (5.375)	0	Yes
	63*	M	Geom. 10A	....	....	....	....	A (5.375)	H (6.00)	4	Yes
	65	M	Eng. 12A	39	52	11	20	A- (5.00)	B+ (4.75)	0	Yes
	66	F	Am. Hist. 11A	63	....	....	16	A (5.375)	B (4.375)	0	No (None)
	67	M	Am. Hist. 11A	77	78	78	85	A- (5.00)	A (5.375)	4	No (Librarian)
			MEAN	43.50	47.40	33.80	46.57	4.82	4.72	1.00	
			Difference between means	25.93	24.03	25.37	20.00	0.72	0.71	0.71	

* Graduate student.

obtainable for each student in the registrar's office. Thus it was possible to make direct comparisons in respect to general intelligence, as measured by the National Council Psychological examination, and in scholarship. In two other important areas of general education, English and mathematics, comparisons could also be made.

Records of student teachers whose pupils' mean final achievement scores excelled by statistically significant differences those of comparable groups taught by the regular classroom teachers are shown in part A of Table 9. Those whose pupils achieved less by statistically significant differences are shown in part B. The general intelligence and scholastic record of each student teacher falling in either of the above categories are presented. Thus, student teacher number 1 exceeded in general intelligence 66 per cent of all of the freshmen who entered the University the semester he did, 68 per cent in English, and 80 per cent in mathematics. When this student graduated, he exceeded 61 per cent of all the members of the graduating class in scholarship. He received an A in supervised student teaching, and an A+ in the special methods course in the subject-matter field in which he did his student teaching, and was a distinguished student one semester. The data show also that he entered the teaching profession. Student teacher number 50 in part B of Table 9 exceeded only 10 per cent of his class in general intelligence, 21 per cent in English, 9 per cent in mathematics, and only 4 per cent in all grades or semester marks earned at the University. He received an A— in student teaching and a P in the special methods course in which he did his student teaching. He was not a distinguished student any semester while he was at the University. He also entered the teaching profession the next year.

Inspection of records contained in the two parts of Table 9 reveals the fact that in general the student teachers in part A excel those in part B in every item listed. This is illustrated by comparing the means. The consistently large differences in the means are shown graphically in Figure 3. In general intelligence, for example, the most successful student teachers exceeded the least successful by 25.93 points on the percentile scale, or 52.71 per cent, in English by 24.03 points, or 50.59 per cent; in scholastic index by 20.00 points, or 42.95 per cent. These are large differences. They indicate quite clearly that the most successful student teachers excel the least successful student teachers, as determined by pupil achievement, in both general intelligence and scholarship.

In Table 9 it will be noticed that more of the records are incomplete in part B than in part A. These records are incomplete because

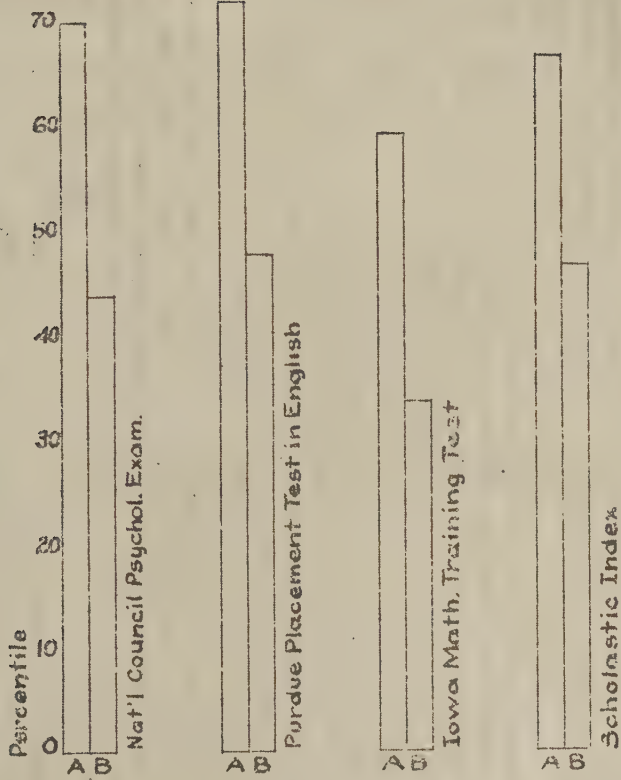


Fig- 3.

GENERAL INTELLIGENCE AND SCHOLARSHIP OF THE MOST AND THE LEAST SUCCESSFUL STUDENT TEACHERS

the students had transferred from other institutions and therefore were under no obligation to take the orientation tests, although they might volunteer to do so. It is interesting to note that the one transfer student in part A, Number 6, had voluntarily taken all these tests except the one in mathematics. On the other hand, the transfer students and the graduate student, Number 63, in part B volunteered to take none of the tests, except one student who took the National Council Psychological Examination. It is possible that these omissions in the records affected the means obtained. However, it is unlikely that the means for part B would have been raised materially if they had been included. Undergraduates who transfer from one institution to another are often weak or maladjusted students, sometimes known as college tramps. If these students had been strong, they probably would have sought permission to take the entrance tests.

The one graduate student in the group, Number 63, was no doubt a strong student, but he was badly maladjusted when he did his work as a supervised student teacher. His case history showed that he had graduated from the School of Engineering eight years before. After having tried the profession of engineering, as well as having prepared for another in the meantime, he finally decided to become a teacher. A very frequent pupil criticism of his teaching was that his explanations were so involved and technical that they were confusing. He also had great difficulty, the records show, in adjusting himself to the level of understanding of high-school pupils. One pupil criticized his teaching as follows: "Although he is very intelligent and knows his subject very well, it was rather difficult for him to make me understand it. His manner of explanation seemed to get me all mixed up. It was too involved." These difficulties rather than poor scholarship probably are chiefly responsible for the fact that his pupils did not achieve well.

Another form of evidence that a very real difference in scholarship existed between the most successful group of student teachers and the least successful may be observed by contrasting the number of students in each group who during their college careers were able to achieve the rating of distinguished student. Thus, as shown in column 11 of Table 9, there were 4, or 57.14 per cent, of the most successful student teachers who achieved the distinguished student rating; whereas there were only 2, or 25 per cent, of the least successful who achieved this scholarship honor. One of the student teachers in the most successful group, number 5, was a distinguished student each semester. A further indication of this person's superior scholarship is the fact that she has obtained a Ph.D. in mathematics.

Professional interest in teaching. Objective evidence in regard to this trait is indicated in Table 9 by the number of persons in each group of student teachers who entered the teaching profession. Also, the marks they received in two professional courses, supervised student teaching and the special methods course in the field in which they did their student teaching, constitute, to some extent at least, evidence of professional interest and ability to teach. The number of persons in the most successful group of student teachers who became members of the teaching profession was six, or 85.71 per cent of the total; whereas the number in the least successful group was four, or only 50 per cent. In other words, thirty-five per cent more of the student teachers in the most successful group entered the teaching profession than entered it from the least successful group.

Further evidence of the fact that there was a real difference in professional interest in teaching between the two groups may be noted from the occupational choices of the student teachers who did not enter the teaching profession. Four student teachers in the least successful group did not become teachers. One of the two men in this group, number 56, became a farmer; and the other, number 67, became a professional librarian after further training in a school for this purpose. The latter's general intelligence is high, as he exceeded 77 per cent of the entering freshmen in his class on the National Council Psychological Examination. His general scholarship at the University was likewise high, since he exceeded 85 per cent of the graduating class in scholarship and was on the honor roll four semesters. However, he suffered from a speech handicap which interfered with his success as a student teacher. His experience as a student teacher probably caused him to change his plans concerning a profession. The following comment written by one of his pupils at the end of the course indicates what his greatest weakness as a teacher was. It probably indicates one reason why he did not enter the teaching profession.

I like him and yet I don't like him. He stutters. He doesn't know what he wants to say. He mispronounces his words. For "big" he says "beeg." I don't like his general attitude.

Neither of the two women in the least successful group of student teachers was employed the next year in any profession. One of these, number 66, did not finish the requirement for a teacher's certificate. Both were interested in music as an accomplishment. Neither was under the economic necessity to earn a living for herself, since each was a member of a rather wealthy family. One was the daughter of a manufacturer and the other of a successful physician in a large

city. A previously unknown weakness in character was discovered at the end of the course for one of them. On the final examination in the methods course, she was discovered to be intoxicated. Upon this occasion in an individual conference the author advised her not to enter the teaching profession. His advice was heeded in this respect at least. In other respects it unfortunately was not.

On the other hand, student teacher number 6—the only student teacher in the most successful group who did not enter the teaching profession—secured a good position as a technician in a large city hospital. She would have made a good teacher according to her critic teacher's final estimate, which reads as follows:

It gives me sincere pleasure to tell you of the work of Miss B. . . .

Miss B. . . . possesses outstanding ability as a student. She required less help than almost any student teacher associated with me during the last ten years. She was able to work out an idea for herself—real initiative. We discussed only general principles—for the most part, for she was well able to apply them with very little direction from me. With the aid of a suggestion here and there she was able to organize her material and present it in a clear understandable fashion. She showed real skill in "getting the correct answer." Her students were inspired to do the work—more than the minimum. I felt that, on the whole, she secured better results with her 9A class than I did with my 9A class this semester. Her class improved in attention, willingness to work, and in grades under her supervision. Miss B. . . . was always neat and well groomed, always courteous, and absolutely fair in her dealings with me and with her students. Her manner was pleasant, although she possesses a considerable amount of reticence. Perhaps she needs to be somewhat more informal and "human." Her students liked her, but the clerks in the office thought her unfriendly. I think they are mistaken in their opinion, but it is true that she is reserved in manner. I consider lack of reticence, however, a far more serious fault than a reasonable amount of reticence. She has been thoroughly dependable and willing to do extra work for me. I feel that with further training and experience Miss B. . . . should become one of our *best* teachers.

A second form of evidence concerning professional interest in teaching consists in comparing the final marks received in professional courses. The two most distinctive professional courses in which the students in this experiment were enrolled were those taken in the senior year, Supervised Student Teaching and Methods of Teaching High-School Subjects. In Table 9 the marks received in these courses by the student teachers in the most successful and least successful groups are indicated. The official designation of these

marks as defined by the registrar is presented in the Purdue catalogue. The pluses and minuses following each mark are the author's and not the registrar's, since official marks do not carry these signs. They are, however, recorded in the author's class books and were obtained from these sources. Numerical equivalents are placed in parentheses. The new system of marks, which went into effect at Purdue University in 1942-43, is as follows: 6-Excellent, 5-Good, 4-Fair, 3-Passing, 2-Condition, 1-Failure.⁶ This system provided the basis for translating the letter marks into the numbers shown in parentheses.

Inspection of the letter marks and the equivalent numbers shows that the most successful group of student teachers excelled the least successful group of student teachers in the average marks received. Thus, the average numerical mark in supervised student teaching of the most successful group was 5.54. This mark is 14.95 per cent higher than the average mark received by the least successful group. About the same relationship holds for the marks received in the methods course. The average mark received by the most successful group is 5.43, whereas for the least successful group it is 4.72. The former is 15.04 per cent higher than the latter. In terms of letter marks, the average mark in supervised student teaching is a high A, whereas the least successful is approximately one grade point lower, or a high B. In the methods course practically the same difference exists. If marks received in these professional courses may be taken as an indication of professional interest in teaching, then there is a difference in the two groups—a difference equivalent to that which exists between an average mark of A and an average mark of B.

Effect of personality. It is generally agreed among psychologists and educators that personality has a great deal to do with success in teaching. According to the study reported by Michener, two "well-established factors which generally accompany good teaching" are that the teachers are (1) "well liked by their students" and that (2) "they possess an interesting and well adjusted personality."⁷ Both of these factors can be used as criteria to compare objectively the most successful with the least successful student teachers in this study. For the first criterion mentioned above, the Purdue Rating Scale for Instructors was used and for the second the Bernreuter Personality Inventory. The reliability and validity of both instruments have been established.⁸ The Bernreuter Inventory has a reliability

⁶ *Catalogue of Purdue University*, 1941-42, p. 154. Purdue University Bulletin, Vol. XLII, No. 3. Lafayette, Indiana: Purdue University, 1942.

⁷ Michener, *op. cit.*, p. 5.

⁸ Robert G. Bernreuter, *Manual for the Personality Inventory*, pp. 4-6. Stanford University, California: The Stanford University Press, 1935.

for its various parts which ranges from .78 to .91, and a validity with four other previously validated tests which ranges from .67 to .91. The validity of the Purdue Scale is synonymous with its reliability and is reported by the authors of the scale to be between .60 and .85.⁹ The Purdue Rating Scale provides evidence on how well the student teachers were liked by their pupils, and the Bernreuter Personality Inventory will throw some light on how well adjusted and perhaps how interesting the personalities of the student teachers in each group were.

Effect of personality as measured by the Purdue Rating Scale. The Purdue Rating Scale consists of ten traits known to be associated with good teaching. The traits are listed as follows: (1) Interest in Subject, (2) Sympathetic Attitude, (3) Fairness in Grading, (4) Liberal and Progressive Attitude, (5) Presentation of Subject Matter, (6) Sense of Proportion and Humor, (7) Self-Reliance and Confidence, (8) Personal Peculiarities, (9) Personal Appearance, and (10) Stimulating Intellectual Curiosity. The scale is a point scale which ranges from zero to one hundred on each trait. Therefore, if the person doing the rating considered the student teacher as perfect on each trait, the sum would equal 1000. The scale is designed as an instrument for pupils to rate their teachers by, although it may be used by critic teachers or other supervisors. As a matter of fact, three of the student teachers in the superior group and one in the inferior group were rated by their critic teachers rather than by their pupils. (See Table 10.) These substitutions were necessary because the pupils' ratings were not available, but the critic teachers' ratings were. The correlation between the two is known to be high. The pupils were given the rating scales at the end of the time devoted to student teaching, or after the student teacher had taught them at least thirty-six lessons. Under the critic teachers' direction the pupils rated the student teachers. The critic teachers, likewise, rated the student teachers on this scale at the end of the training period.

It will be observed from the data shown in Table 10 that the student teachers in Part A received on the average a higher rating on the Purdue Rating Scale than the student teachers in Part B. The student teachers in Part B, it will be recalled, achieved results which were less by statistically significant differences than the regular teachers obtained with comparable pupils. The superiority in rating received by the better student teachers is clearly manifested by the fact that the mean in each of the traits received by the student teachers

⁹ G. C. Brandenburg and H. H. Remmers, *Manual for the Rating Scale for Instructors*, pp. 6-7. Lafayette, Indiana: Lafayette Printing Company, 1928.

RATING OF MOST SUCCESSFUL AND LEAST SUCCESSFUL STUDENT TEACHERS ON THE PURDUE RATING SCALE FOR INSTRUCTORS

Part	Student's No.	Student's Sex	Number of Pupils	Sum of All Averages	Interest in Subject (Trait 1)	Sympathetic Attitude (Trait 2)	Fairness in Grading (Trait 3)	Liberal and Progressive Attitude (Trait 4)	Presentation of Subject Matter (Trait 5)	Sense of Proportion and Humor (Trait 6)	Self-Reliance and Confidence (Trait 7)	Personal Peculiarities (Trait 8)	Personal Appearance (Trait 9)	Stimulating Intellectual Curiosity (Trait 10)
A.	1*	M	----	862.00	82.00	85.00	94.00	97.00	85.00	72.00	82.00	99.00	99.00	67.00
	2*	M	----	683.00	78.00	73.00	73.00	74.00	57.00	69.00	61.00	77.00	72.00	49.00
	3	F	28	868.10	82.61	89.39	91.82	90.32	86.29	84.25	78.46	86.14	93.48	85.33
	4	M	25	817.83	83.00	82.60	82.00	84.70	75.76	78.80	77.50	80.96	92.80	79.71
	5	F	28	735.53	70.60	73.97	80.78	77.63	64.40	72.11	61.35	80.40	89.96	64.33
	6*	F	----	921.00	90.00	96.00	100.00	90.00	92.00	97.00	75.00	99.00	97.00	85.00
	7	M	23	790.40	82.10	78.00	78.80	78.20	72.03	81.00	71.30	82.00	88.50	78.50
B.		MEAN		811.86	81.04	82.57	85.77	84.55	76.07	79.17	72.37	86.36	90.38	72.69
	50	M	34	612.50	75.41	65.00	58.79	62.18	50.42	51.00	51.14	61.14	84.97	52.47
	56	M	25	662.42	74.70	66.50	74.10	72.10	62.67	61.30	53.10	63.50	69.70	64.75
	60	F	15	803.16	80.17	80.83	81.83	81.50	77.83	81.17	73.50	77.83	90.00	76.50
	62	F	30	733.70	76.33	79.53	77.00	76.30	73.00	69.26	59.86	73.59	81.80	67.03
	63	M	16	771.88	86.75	90.81	87.06	86.13	49.25	71.75	64.25	74.26	95.19	66.13
	65*	M	----	827.00	73.00	74.00	88.00	84.00	72.00	74.00	95.00	80.00	92.00	75.00
	66	F	28	737.36	73.69	79.39	66.71	79.21	73.32	68.86	67.25	75.50	86.54	66.89
	67	M	17	627.40	75.20	67.90	61.50	71.00	53.30	74.10	46.80	51.80	71.00	54.80
		MEAN		721.93	76.91	75.49	74.38	76.55	63.97	68.93	64.11	69.70	83.90	65.44
Diff. between means				89.93	4.13	7.08	11.39	8.00	12.10	10.24	8.26	16.66	6.48	7.25
Per cent higher				12.46	5.37	9.38	15.31	10.45	18.91	14.85	12.88	24.05	7.72	11.08
Means in A are above means in B.														

* Rated by Critic Teacher.

in Part A is higher than the corresponding mean received by the student teachers in Part B. For all traits combined the mean rating of the most successful student teachers was 811.86, whereas the rating for the least successful group of student teachers was 721.93. In other words, the mean rating for the most successful group of student teachers was 12.46 per cent higher than that received by the least successful group. The unanimity, as well as the size of the differences, with which the ratings received by the student teachers in Part A excelled the ratings received by the student teachers in Part B provides strong evidence that the student teachers who teach the pupils the most are also the best liked. It supports with emphasis the generalization made by Michener that successful teachers are well liked by their students.

For the separate traits in the scale, comparison of the mean differences shows that the largest difference is in personal peculiarities. In this trait the mean rating of the most successful group of student teachers was 86.36, whereas the mean rating of the least successful group was only 69.70. For this trait, which is unquestionably a trait of personality, the best student teachers received a rating from their pupils nearly 25 per cent higher than that received by the student teachers whose pupils' achievement was significantly less than that obtained by the regular classroom teachers. The results show, therefore, that personal peculiarities, characterized by annoying mannerisms or objectionable peculiarities of one kind or another, are attributes of personality which differentiate more than any other single trait the good student teachers from the poor. Annoying mannerisms are overt acts which may be observed and enumerated. Their presence indicates that quite likely the teacher lacks other qualifications that are essential to success in teaching. If there are annoying mannerisms, the chances are high, according to the results of this study, that the student teacher is not well liked by his pupils.

Other personal traits recorded by the Purdue Rating Scale are (1) Sympathetic Attitude, (2) Liberal and Progressive Attitude, (3) Sense of Proportion and Humor, (4) Self-Reliance and Confidence, and (5) Personal Appearance. On all of these traits the most successful student teachers received substantially higher ratings than the least successful. It is perhaps significant to note that the second greatest difference in personality traits between the good and poor student teachers is in "sense of proportion and humor." This is characterized by a person's giving evidence in his behavior of possessing proper balance and of not being too sensitive or too critical.

The personal trait in which there was the least difference was in personal appearance, although even in this trait the most successful group of student teachers was nearly 8 per cent higher than the least successful. It is interesting to note that this trait received the highest numerical rating in each group. The mean rating was 90.38 for the most successful group and 83.90 for the least successful. The same fact was observed for another sampling of student teachers reported in Chapter VI.¹⁰ It apparently is true that both good and poor student teachers rank high in personal appearance. The inference follows that, if this is true generally, then superintendents who employ teachers largely on personal appearance or "on their looks" are not using the best criterion in judging the personality traits of a successful teacher.

The remaining traits in the Purdue Rating Scale may be classified as those dealing with either scholarship or those belonging particularly to the profession of teaching. Thus, the pupils' ratings in respect to the teacher's interest in the subject he is teaching (Trait 1) and his ability to stimulate intellectual curiosity or to inspire the pupils to independent effort (Trait 10) are indicative of the impression he leaves with them of his scholarship. It is important to note that the better ratings which the student teachers in Part A received in these two traits support the evidence already presented in this chapter that the better student teachers have the better scholarship. The ratings indicate, however, that the pupils were able to distinguish less difference between the most successful and the least successful student teachers on this trait than for the traits dealing more strictly with personality. The two traits which seem to be directly related to the profession of teaching, fairness in grading and presentation of subject matter are, on the other hand, similar to the personal traits in that the most successful student teachers received on the average much higher ratings than the least successful.

Differences in personality as determined by the Bernreuter Personality Inventory. Objective evidence concerning the types of personality represented among the student teachers in the most successful group, as well as in the least successful group, was obtained by asking each student teacher to answer the questions on the Bernreuter Personality Inventory. The inventory was taken under uniform conditions at the end of the course in supervised student teaching. It was administered and scored by the W. P. A. supervisor who assisted the writer in scoring the tests employed in this study. All student

¹⁰ See Table 22, p. 113, and Fig. 6, p. 115.

teachers were asked to take the inventory, but a few for one reason or another failed to do so. Records were complete, however, for all the student teachers whose pupils achieved significantly better results than comparable pupils taught by the regular classroom teachers. They were likewise complete for all the student teachers—except one—whose pupils achieved significantly poorer results. The exception was student teacher number 66. There were then seven student teachers in the superior group and seven in the inferior group whose personalities were inventoried.

There were six measures of personality in the inventory. With their accompanying symbols and explanations they are listed below as follows:

B₁-N. A measure of neurotic tendency. Persons scoring high on this scale tend to be emotionally unstable. Those scoring above the 89th percentile would probably benefit from psychiatric or medical advice. Those scoring low tend to be very well balanced emotionally.

B₂-S. A measure of self-sufficiency. Persons scoring high on this scale prefer to be alone, rarely ask for sympathy or encouragement, and tend to ignore the advice of others. Those scoring low dislike solitude and often seek advice and encouragement.

B₃-I. A measure of introversion—extroversion. Persons scoring high on this scale tend to be introverted; that is, they are imaginative and tend to live within themselves. Scores above the 98th percentile bear the same significance as do similar scores on the B₁-N scale. Those scoring low are extroverted; that is, they seldom worry, seldom suffer emotional upsets; and rarely substitute day dreaming for action.

B₄-D. A measure of dominance-submission. Persons scoring high on this scale tend to dominate others in face-to-face situations. Those scoring low tend to be submissive.

F₁-C. A measure of confidence in oneself. Persons scoring high on this scale tend to be hamperingly self-conscious and to have feelings of inferiority; those scoring above the 98th percentile would probably benefit from psychiatric or medical advice. Those scoring low tend to be wholesomely self-confident and to be very well adjusted to their environment.

F₂-S. A measure of sociability. Persons scoring high on this scale tend to be non-social, solitary, or independent. Those scoring low tend to be sociable and gregarious.¹¹

After the student teachers had filled out the inventory individually under laboratory conditions, the questions were scored with the proper key for each trait. There were 125 questions in all, each of which

¹¹ Bernreuter, *op. cit.*, p. 1.

was to be answered by encircling a yes, no, or a question mark placed opposite each question. Each twenty-fifth question is given below in order to provide a sample of the questions in the inventory. The answers indicated are those of student teacher number 1, whose pupils achieved more relative to the control pupils with whom they were paired than pupils taught by any other student teacher. The personality traits of this student teacher will also be analyzed in the latter part of this chapter.

- | | | | | |
|------|-----|----|---|---|
| 1. | Yes | No | ? | Does it make you uncomfortable to be "different" or unconventional? |
| 25. | Yes | No | ? | Are you inclined to study the motives of other people carefully? |
| 50. | Yes | No | ? | Do you usually try to avoid arguments? |
| 75. | Yes | No | ? | Are you able to play your best in a game or contest against an opponent who is greatly superior to you? |
| 100. | Yes | No | ? | Do you prefer to be alone at times of emotional stress? |
| 125. | Yes | No | ? | Would you feel very self-conscious if you had to volunteer an idea to start a discussion among a group of people? |

Since there are six scales in the inventory, the papers were scored six times by a separate scoring key for each scale. Likewise, there were six separate raw scores for each student teacher. These were converted into percentile scores in accordance with a table provided for the purpose by the author of the scale. The scores can thus be interpreted easily by seeing how any individual compares with others in the same group who have taken the test previously. Different norms are provided for college men, college women, adult men, adult women, high-school boys, and high-school girls. In this study the norms for college men and college women were used.

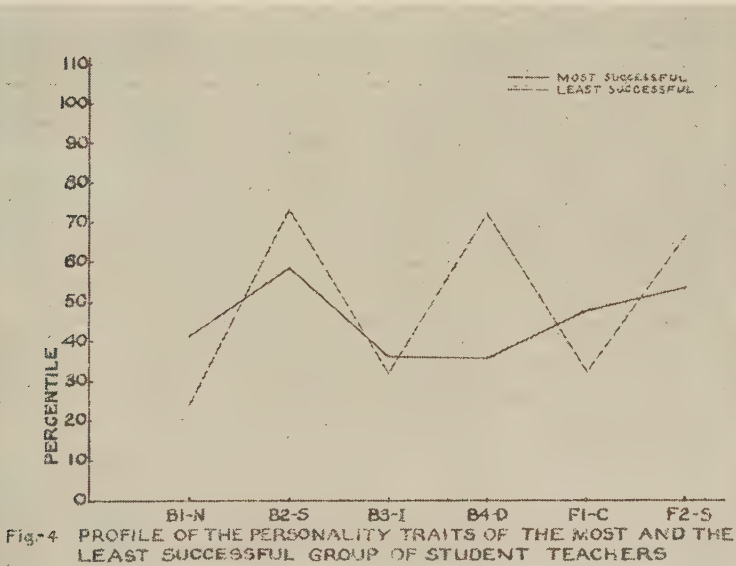
In Table 11 the percentile scores of the most successful and least successful group of student teachers are shown. Part A constitutes the most successful group and Part B the least successful. An examination of the data in Table 11 reveals the fact that the student teachers in each group differ widely from each other. For example, in Part A, student teachers 1 and 7 are almost diametrically opposed to each other in all traits except two. The two in which they are alike are in self-sufficiency and in dominance-submission. Examination of the explanation of the scale, page 70, shows that both are self-sufficient and that both tend to be submissive rather than dominant. In all other respects they are unlike each other. In Part B, student teachers 50

TABLE 11
BERNREUTER PERSONALITY INVENTORY OF MOST SUCCESSFUL AND LEAST SUCCESSFUL OF STUDENT TEACHERS

Part	Student Teacher's Number	Sex of Student Teacher	Subject Taught	Neurotic Tendency (B ₁ -N)	Self-Sufficiency (B ₂ -S)	Introversion-Extroversion (B ₃ -I)	Dominance-Submission (B ₄ -D)	Self-Confidence (F ₁ -C)	Sociability (F ₂ -S)	Age (Years)
A	1	M	Am. Hist. 11B	94	77	92	9	98	98	23
	2	M	Am. Hist. 11A	29	13	20	31	82	2	25
	3	F	Alg. 9B	18	55	15	80	13	25	21
	4	M	Econ. 12B	18	52	15	90	25	36	23
	5	F	Alg. 11B	68	55	52	12	68	74	21
	6	F	Eng. 9A	63	88	59	19	43	94	22
	7	M	Geom. 10B	1	70	3	11	9	50	25
MEAN				41.57	58.57	36.57	36.00	48.29	54.14	22.86
B	50	M	Civics 12A	1	91	4	97	2	62	28
	56	M	Arith. 9A	33	11	46	45	66	21	30
	60	F	Eng. 11A	16	89	25	94	10	78	21
	62	F	Am. Hist. 11A	17	81	26	98	25	77	21
	63	M	Geom. 10A	17	88	16	70	20	82	29
	65	M	Eng. 12A	14	90	22	92	22	81	22
	67	M	Am. Hist. 11A	72	63	73	14	83	67	21
MEAN				24.28	73.28	30.28	72.86	32.57	66.86	24.57

and 67 offer about as pronounced contrasts in several of the traits. Inspection of the percentile scores of other individuals in both Part A and Part B show wide differences in personality.

Contrast of the mean scores, however, does show a difference in pattern between the two groups taken as a whole. This is best illustrated by examining Figure 4. In Figure 4 it may be seen that the profile of the mean traits of the most successful group of student teachers adheres more closely to the average, or lies between the 40th and the 60th percentiles, than does the profile of the mean traits belonging to the least successful group of student teachers. This fact



no doubt indicates that, taken as a whole, in the most successful group student teachers have personality traits that deviate less from the mean of college students than in the least successful group. The greatest difference between the two groups is in respect to dominance-submission (B_4-D). An examination of the interpretative data concerning this trait, page 70, shows that the least successful group tends to dominate others. The average percentile score for this trait is in the 73rd percentile, nearly, whereas the average percentile score of the most successful group is in the 36th percentile. This may be of considerable significance since it indicates that the student teachers who teach high-school pupils the most successfully are not of the

dominant or bossy type. It may also mean that the student teachers with dominant personalities are not inclined to do what their supervisors tell them to do.

A trait which is related, self-sufficiency (B_2-S), likewise shows considerable difference between the two groups. One of the characteristics of the trait of self-sufficiency (see explanation of the scale, page 70), is the tendency to ignore the advice of others. The considerably lower average score made by the student teachers in Part A—the most successful group—indicates that they are not so much inclined to ignore the advice of others as the least successful group. On the other hand, the lower average score of the least successful group in B_1-N —neurotic tendency—indicates that the least successful student teachers are probably better adjusted to life, in the sense that they are less inclined to worry and to be emotionally unstable than the most successful group. It must be said, however, in behalf of the better student teachers that their average score is much nearer the average for college students than that of the least successful group. Both groups are lower than the 50th percentile in neurotic tendency, which indicates that both groups on the average are well adjusted to life, since low scores on this trait indicate emotional balance.

Another fact that deserves mention is the average age of the two groups. The average age of the most successful group of student teachers was 22.86 years, whereas that of the least successful group was 24.57. In other words, the most successful group was nearly two years younger on the average than the least successful group. There were three individuals in the least successful group twenty-eight years of age or over. The oldest was thirty. All these individuals had tried some other occupation and had found that they were not adjusted to it. Teaching, therefore, was a second choice. They had experienced failure or a sense of frustration in some other occupation before turning somewhat late in life to the profession of teaching as a career.

Individuals may be selected from either or both groups who have much the same personality pattern. The most common pattern of personality for the least successful group is represented in the following five individuals: numbers 50, 60, 62, 63, and 65. (See Table 11). Student teachers 3 and 4 in Part A have much the same personality pattern, except in sociability (I_2-S). It consists in a low score in neurotic tendency, indicating that these individuals are well adjusted to life; a high score in self-sufficiency, indicating that they tend to ignore the advice of others; a low score in introversion-extroversion, which indicates that they are extroverted, that is, seldom worry or

suffer emotional upsets; a high score in dominance-submission, which means that they tend to dominate others in face-to-face situations; a low score in F_1-C , which means that they are wholesomely self-confident and very well adjusted to their environment; and a high score in F_2-S , which indicates that they tend to be non-social, solitary, and independent. Seven, or one-half, of the student teachers, in considering individuals with similar personalities in both groups, have this general personality pattern. It is important to note that more individuals in Part B have a common personality pattern than in Part A. The student teachers in the most successful group have

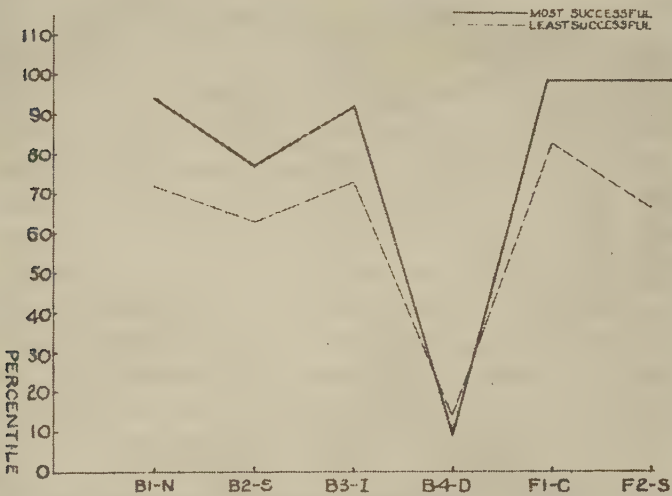


Fig-5 -PROFILE OF THE PERSONALITY TRAITS OF THE MOST SUCCESSFUL STUDENT TEACHER (NO.1) AND LEAST SUCCESSFUL STUDENT TEACHER (NO.67)

personality patterns that vary more from one another than the student teachers in the least successful group. In fact, none have the same pattern except for the two who have been mentioned.

No other pattern is common for two or more individuals except for student teachers 1 and 67. The interesting thing about this pair is that one was the most successful of all sixty-seven student teachers included in the experiment and the other was the least successful. Their profiles are presented in Figure 5. It is apparent from the profiles that the general pattern of their personality traits is much the same. Both of them rank high in B_1-N , the measure for neurotic tendency, which indicates that they tend to be emotionally unstable.

Both have about the same relative position in B_2 -S, the measure of self-sufficiency. In other words, the inventory reveals that they prefer to be alone, tend to ignore the advice of others, and rarely ask for sympathy or encouragement. Their high scores in B_3 -I indicate that both are introverts—that they are imaginative and tend to live within themselves. One of the most striking characteristics common to both is the tendency to be submissive. Only 9 per cent of the college men previously tested are more submissive than student teacher number 1, and only 14 per cent more submissive than student teacher number 67. Both are almost hampering self-conscious and suffer feelings of inferiority. According to the author of the scale, student teacher number 1 should have the advice of a psychiatrist concerning his inferiority complex, since he ranks in the 98th percentile for college men in this respect. A factor which contributed to the inferiority complex and self-consciousness of each was that each had a speech defect. Both stuttered, but not seriously. This fact was mentioned by the critic teacher of each and also by the pupils in their evaluation.¹² Neither is inclined to be sociable, since the high scores in F_2 -S indicate that both tend to be non-social, solitary, and independent.

Further information concerning the personality of these men may be obtained from statements made by critic teachers and pupils. It will be seen that in general these statements and the inventory are in agreement concerning the personality of the men. What is of more importance is that the statements and inventory are complements to one another in the understanding of their personalities. The personality inventory and statements made about them by the critic teachers and ratings by pupils give a better idea of the personality of each man than either alone.

The pupils' rating on the Purdue Rating Scale—Table 10—shows that student teacher number 67 was not well liked by his pupils. His total rating in points was 627.40, next to the lowest in the two groups. On the separate traits listed in the Purdue Rating Scale he ranked well below the average of the least successful group of student teachers in every trait except sense of proportion and humor, and all his ratings were much below the average obtained by the most successful group.

His critic teacher's final report mentions specifically his sense of humor, the one trait in which he received a higher rating at the hands

¹² See page 63 for a pupil comment concerning student teacher number 67, and pages 77 and 79 for critic teachers' statements.

of the pupils than the average received by the least successful group of student teachers. Certain other statements are made by the critic teacher which indicate behavior in conformity with the results obtained from the personality inventory. Her report reads as follows:

I have found Mr. (name of student teacher number 67) to be of superior intelligence. His work was above average. His knowledge of subject matter was superior. I found him to be prompt, dependable, and courteous. He is most conscientious, doing extra work promptly and well. He was perfectly willing to do more than was required. He has a sense of humor, and a very deep sense of responsibility. I found also that at times he is too diffident and that he is easily confused and worried. He has a slight stoppage in his speech which is more in evidence when he gets excited. However, this handicap is so slight that I think it will not hinder his work as a teacher. He had very good disciplinary control of his class. Because of the quality of work done, my estimate of his semester grade is an A. I believe that he will make a good teacher.

There are at least three significant statements contained in the above report: first, that he has superior intelligence, that his knowledge of subject matter was superior, but that at times he was too diffident, became confused easily and was subject to worry; second, that he was prompt, dependable, courteous, most conscientious, and perfectly willing to do more than was required; and third, that he got excited, at which time his speech handicap was more in evidence than usual. These qualities and trait actions are in accordance with his personality inventory. The first indicates that he was probably an introvert. Superior students are often, but not necessarily, introverts. The fact that he was too diffident at times and was inclined to worry is in harmony with the high score which he made in B₃-I, indicating an introversion trait. His critic teacher found him to be prompt, dependable, and courteous. She said, moreover, that he was perfectly willing to do more than was required and that he could be depended upon to do it promptly and well. In other words, he was submissive and was willing to be dominated. This behavior is in perfect agreement with his low score in B₄-D, which indicates that he tends to be submissive in face-to-face situations. The third statement indicates that he got excited and that his work worried him. When he became excited, he experienced a more noticeable "stoppage in speech." This behavior is in agreement with his high score in B₁-N—a score indicating a strong tendency towards emotional instability. Self-consciousness, accompanied by an inferiority complex, was probably the effect of his speech handicap. The personality inventory revealed

this as a fundamental trait of his personality. The critic teacher in her judgment of personality did not know that this trait was as deep-seated as it was.

Because of his superior intelligence, unusually good knowledge of subject matter (scholarship), and willingness to work, his critic teacher recommended a high semester mark in student teaching. She was of the opinion that he would become a good teacher, but she qualified it by the words, "I believe." His pupils did not think that he was a good teacher. They rated him far below the average obtained by the poorest student teachers. Since his pupils achieved less in comparison with the regular teachers than did those under any other student teacher, it is apparent that they were right. He, himself, did not believe that he was a good teacher. This may be inferred from his comment found on the last lesson plan:

This is my last day with these people. They have added to my store of gray hairs from time to time. Now that it's over I'm very glad that I took the course. I don't think that I will ever be as frightened by a course as I was by this one.

It was fortunate perhaps that he did not enter the teaching profession. His experience as a student teacher convinced him that he would not be happy in the work. His case shows clearly that superior intelligence, excellent knowledge of subject matter or scholarship, and even willingness to work, important as they are, do not guarantee success in student teaching. Neither do they guarantee success in regular teaching, as the case of the next student will show.

The personality of the student teacher whose pupils made the greatest gain, student teacher number 1, is strikingly like that of the student teacher described above. In all respects, however, his personality traits deviate even more from the average. He is somewhat more inclined to be unstable emotionally as shown by his high score in B_1-N . His personality graph shows that he is more of an introvert, B_2-S , than student teacher 67. He is considerably more submissive in face-to-face situations, B_4-D . His lack of self-confidence is even more pronounced. In fact, he was so self-conscious and felt so inferior at times, according to his score in F_1-C , that he would have been benefited by psychiatric or medical advice. Moreover, he was very anti-social and independent according to the high score he received in F_2-S . Altogether his personality was such that one would have no more reason to suspect that he would be successful than that student teacher 67 would be.

The evaluation he received from his critic teacher is very much like that written by number 67's critic teacher. The critic teacher's evaluation of student teacher 1 is presented below :

The grade I would give Mr. (name of student teacher number 1) is A+. He has worked hard and well with a difficult class. His preparation, so far as I can judge, is excellent. In fact, the background he possesses in American history is far better than that of any other practice teacher that I have had. He takes criticism well and has always worked conscientiously at any point which has been suggested for improvement. He has been eminently dependable and has offered many, many times to do extra work and has been very helpful in many ways.

Probably his greatest handicap is a speech difficulty, which makes it a bit hard to understand him at times. However, he is working on it and should improve. He has a tendency to be rather sharp in his comments to the class and should learn a bit more discretion here, I believe. However, he seems very much at home in the classroom and meets every situation with a great deal of poise.

There are certain points mentioned in this evaluation that are in agreement with the inventory. For example, it is apparent that he is a good student. "The background he possesses in American history is far better than any other practice teacher I have had," says his critic teacher. Also, he is dependable and takes criticism well. Both of these judgments indicate that this student teacher is able, and at the same time willing, to profit from his critic teacher's suggestions. He is not weak and dependent upon the critic teacher in his chosen field. He is self-sufficient—a trait, according to the inventory, in which he ranks high. A speech handicap is mentioned, which probably has a deep influence upon his personality. This handicap is in harmony with the rating he received in sociability (F_2 -S), which indicated that only two per cent of college men were less sociable than he. The writer observed that he always walked by himself and was seldom one of a group of students in the University halls or on the campus. He took little or no part in the activities available for college students on the campus or in social life. All his interests seemed to be centered in his work as a student. He impressed all who knew him as a very serious and intellectual young man with little time or patience for levity of any sort.

An indication of his tendency to be submissive is shown in his critic teacher's statement: "He has been eminently dependable and has offered many, many times to do extra work and has been helpful

in many ways." On the Purdue Rating Scale (see Table 10) the trait in which he received next to his lowest rating was sense of proportion and humor. His critic teacher says also that he has a tendency to be rather sharp in his comments to the class. She adds that she believes that he should be more discreet in this respect. These evaluations fit into the general personality pattern of lack of balance and emotional instability indicated by the Bernreuter scale. However, his work as a supervised student teacher did not bring this instability into sharp focus. His pupils made remarkable progress and his critic teacher was well pleased with his work. It required a more serious test of his emotional control than student teaching afforded to reveal this trait of personality in his subsequent behavior.

The following letter, which the author received from him at the end of the next year, shows that in an actual teaching situation an incident occurred when for a few brief minutes he "let his heart rule his reason." As a result, according to his opinion, he failed to secure a contract for the second year.

Dear Professor Ryder:

Perhaps you may recall the rather spirited discussion that Mr. S. . . .¹³ and I had last year in one of your Methods classes. Mr. S. . . . argued that a teacher should stick to his own beliefs even when they were in opposition to those of his principal and to those of his board of education. Since this was an argument, and since I was usually on the other side of the question from Mr. S. . . .'s stand, I supported the other side of the argument, namely, that for a teacher's own good, he should hide his own doctrines and beliefs, and accept those of the powers that be whenever the occasion demanded. I have already had such an experience.

The ironical part of the whole thing is that I did not accept my own line of reasoning at the time, but followed Mr. S. . . .'s. It all occurred at the second semester registration. The schedule had been remodelled several times, but we were still left with several conflicts. The one that was finally accepted over my vigorous objection was one which caused a conflict with a graduating senior, yet made room for a junior who had just failed the course for the second time. And the junior was the daughter of the president of the board of education. I let my heart rule my reason for a few brief minutes, and when the protesting was over, the schedule was unchanged and my own position hadn't been improved.

When the contracts were issued in May, I didn't receive mine. The reasons were many and varied, but they were too subtle to

¹³ Student teacher number 2. See Table 10.

mention the schedule incident. Among the many reasons were, the cut in the budget which reduced the amount of state aid, my grades were too low, a woman was needed to teach girls' physical education and they were getting one who could do my job too. The economic condition of course prevented the hiring of an additional teacher.

Strange as it may seem, I don't feel the least bit bitter about the whole thing. I had an enjoyable time while I was there, and I gained a lot of valuable experience. In addition, I have the satisfaction of having had the principal of the school tell me that I was the best beginning teacher that he had ever seen. My one regret is the many friends I leave behind.

I hope that you can use this incident as an illustration to those who aspire to the teaching profession.

This letter gives evidence of two other traits portrayed in the personality inventory, namely, B₃-I and B₄-D. It is evident, for example, that student teacher number 1 did not accept the "many and varied" reasons given as to why he did not receive a contract for the second year. He considers his employers as too subtle to give the real reason. In his own mind the dismissal was traceable to the incident which he describes in detail. He offers no objective evidence in respect to any other person's opinion that this was the true reason, but, like a true introvert, has meditated upon the matter and has arrived at his own conclusion, which he accepts as the true one. It may be inferred from his own words that emotional instability caused him to fail to secure a contract for the second year. He says, "I let my heart rule my reason for a few brief minutes." He also says that he vigorously protested the action taken—a form of behavior indicating lack of discretion in a beginning teacher.

Then too there is the matter of submission. A significant statement is, "Strange as it may seem, I don't feel the least bit bitter about the whole thing." He does not fight back, he says he is not bitter, he is willing to accept the verdict, he leaves with few regrets—he is submissive. This behavior is in entire agreement with his score in B₄-D, which indicates that only nine per cent of college men are more submissive and docile in spirit than he.

The analysis of personality traits of the most successful and least successful student teachers shows that the most successful student teachers' personalities conform more closely to the average for college students than the least successful teachers'. Extreme types of personality, such as that possessed by the two men whose pupils made the greatest and least amount of progress respectively, although interesting, are not likely to be adapted to success in the school-

room. Teachers with a personality pattern similar to that possessed by these two men are not likely to get along well with people even though they do possess superior intelligence, an excellent background of subject matter, willingness to work, and the desire to improve. A school teacher with an interesting personality is not always one who will be well liked by either his pupils or employers.

SUMMARY

In this chapter it was shown, first, that the results obtained by comparing the paired class groups for all student teachers verified the results obtained from the same data by the large sample method. The results from both methods showed that for the vast majority of high-school pupils, learning, as determined by growth in achievement, is just as effective under supervised student teachers as under the regular high-school teachers. In Chapter II it was shown that the difference in achievement was not statistically significant for nearly one thousand paired high-school pupils enrolled in various academic subjects. In this chapter it was shown that fifty-two of the total number of sixty-seven student teachers did just as well as the regular teachers, and that of the remaining fifteen, seven of them did better and eight poorer than the regular teachers. Second, these teachers were identified and compared in various ways. Data were presented to show that both in general intelligence and scholarship the most successful group of student teachers was superior to the least successful group. This finding is important because it indicates that high general intelligence and good scholarship are important characteristics of really good high-school teachers. However, general intelligence and scholarship alone were shown not to be sufficient to guarantee success in student teaching. The most successful student teachers were shown to be persons who were better liked by their pupils than the least successful group. Moreover, when their personalities were analyzed, it was found that most successful student teachers, taken as a whole, had personalities more nearly like the average college man or woman than the least successful student teachers.

Great deviations from the average characterized the personalities of the two individuals whose pupils made the greatest and least amount of progress respectively. The individual who was least successful found from his experience as a student teacher that he would not be happy in the teaching profession and therefore prepared for another profession which would not bring him into such direct contact with people as teaching requires. The person who was most

successful as a student teacher entered the teaching profession, but failed to be re-employed the second year. His failure as a teacher was analyzed as due to emotional instability—a trait of personality which was not recognized by his critic teacher or University supervisor to be as serious as it really was. This failure to judge correctly personality on the basis of behavior alone shows the desirability of using a good personality test as a part of the program for selecting student teachers.

CHAPTER V

A STUDY OF THE ATTITUDE HIGH-SCHOOL PUPILS HAVE TOWARD STUDENT TEACHERS AND THE SUBJECTS TAUGHT BY THEM

Comparisons of achievement in the field of pupil attitudes toward student teachers has not been undertaken by many investigators up to the present time. In his review of previous studies the writer was able to find only one study that investigated the matter of pupil attitudes toward student teachers.¹ He found that two investigators had advocated the making of studies of pupils' attitude toward student teachers and the subjects they teach, but so far very few have been made.² Specifically, the three most comprehensive bibliographies on the education and training of teachers in the United States contain not a single reference to objective studies made of pupils' attitudes toward student teachers.³ It is the writer's purpose to present his own findings in this chapter. The first part deals with an investigation of high-school pupils' attitude toward student teachers and the last part with the problem of possible changes in attitude towards the subject when taught by supervised student teachers.

¹ W. D. Ward, H. H. Remmers, and N. T. Schmalzried, "The Training of Teaching Personality by Means of Student Ratings," *School and Society*, LIII (February, 1941), 189-92.

² Carl G. F. Franzén, *Comparison of Results Made on Certain Standardized Tests by Pupils in the Bloomington High School Who Were Taught in Classes of the Same Grade by University Student Teachers*. Bulletin No. IV, Vol. II, School of Education, Indiana University, Bloomington, Indiana: Indiana University, 1926.

Sister M. Rayneria Willison, "A Study of the Achievement of Elementary School Children Who Were Taught by Student Teachers with Children Who Were Taught by Regular Teachers," Master's Thesis, Creighton University, Omaha, Nebraska, 1933.

³ (1) *National Survey of the Education of Teachers*, Vol. I, Bulletin 1933, No. 10. This volume contains 1,297 annotated references selected from approximately 4,000 references, published before June 1, 1932. (2) *Education of Teachers*, Pamphlet No. 66, 1936, U. S. Office of Education. This pamphlet is a continuation of Vol. I. It contains 275 annotated and classified references selected from approximately 1,700 references published between June 1, 1932, and October 1, 1935. (3) *Education of Teachers Selected Bibliography, October 1, 1935, to January 1, 1941*. Bulletin 1941, No. 2, U. S. Office of Education. This compilation includes selections from approximately 3,000 references published between October 1, 1935, and January 1, 1941.

HIGH-SCHOOL PUPILS' ATTITUDE TOWARD SUPERVISED STUDENT TEACHERS

In order to determine the high-school pupils' attitude toward supervised student teachers, the Remmers and Hoshaw scale, Form A, was administered at the beginning of the training period.⁴ At the end of this period, or about seven weeks later, Form B of the same scale was administered to the pupils. A copy of the scale is presented in the complete study.⁵ Evidence of the validity and reliability of this generalized scale may be found in a monograph by Remmers and his students.⁶ In general, the claim for the validity of the scale is based on the validity of Thurstone's technique in measuring attitude. In this connection Hoshaw says:

If we may assume the technique of Thurstone and others to be the correct technique for developing attitude scales, then we may assume that the scale described in this experiment will measure the attitude of a student toward any teacher.⁷

Hoshaw found that the correlation between his scale and the Purdue Rating Scale for Instructors was $.506 \pm .017$. The reliability of the scale was reported by Hoshaw to be $.738 \pm .019$.⁸

The scales were administered to the pupils of the twenty-seven student teachers who received their training under the author's supervision during the regular school year of 1936-37. However, the returns from only twenty-six of the student teachers could be employed in the study. This was due to the fact that a similar class in one subject (civics) was not available for comparative purposes. Comparable classes were obtained on the basis of the mean I. Q. A comparable class for the purpose of this study consisted of one in the same subject at the same semester grade level taught by a regular teacher. The control class had also approximately the same mean I. Q. as a class taught by a supervised student teacher.

The scales were administered by the classroom teachers according to uniform directions under the authority of the high-school principal.

⁴ The scales were administered for the first time after the student teachers had taught their class groups for approximately one week.

⁵ Ryder, *op. cit.*, p. 281.

⁶ Loyal D. Hoshaw, "The Construction and Evaluation of a Scale for Measuring Attitude Toward Any Teacher," *Studies in Higher Education*, XXXI, pp. 238-51. Bulletin of Purdue University, Vol. XXXVII, No. 4. Lafayette, Indiana: Purdue University, 1936.

⁷ Hoshaw, *op. cit.*, p. 241.

⁸ *Ibid.*, p. 243.

The directions to the critic teachers who had student teachers read as follows:

In order to compile data for the continuance of the experiment already begun concerning achievement in subject matter and attitude toward student teachers, I find it necessary to ask you to give this attitude scale to the pupils in your (*no. of class hour*) class which is now being taught by (*name of student teacher*). The pupils should use their judgment carefully when they read each of the attitude statements and should try to express as accurately as possible the attitude they actually have towards (*name of student teacher*). In order to keep experimental conditions uniform you should ask the student teacher to leave the room while the rating is being done. It is important that you follow the directions given at the top of the scale. It should not take over ten minutes of the class time to administer the scale. It would be very desirable if you would give the scale on either Tuesday or Wednesday of this week. As soon as possible after administering the scale, please return the papers to Room 232.

Similar directions were sent to the teachers comprising the control classes. The form sent to them read as follows:

As it is necessary to compile data for the experiment already begun concerning achievement in subject matter and attitude toward teachers, I find it necessary to ask you to give this attitude scale to the pupils in your (*no. of class hour*)⁹ hour class. Please give this scale according to the directions. I would suggest that you take a part of the supervised study period for this work. The pupils should understand that they are marking on the scale their attitude towards you. Please return the papers as soon as possible after administering the scale to Room 232.

The ratings were made in the experimental and control classes at approximately the same time, that is, on the same day if possible. For the first semester these ratings were made during the first week in December and the third week in January, and for the second semester during the second week in March and the first week in May.

The record for each student teacher's class and the corresponding control class is presented in Table 12. The entries have been grouped according to subject taught rather than by semester. Thus, the history and civics classes appear first or at the top of the table. There are ten of these classes. These are followed by six classes in English, which in turn are followed by five classes in science, consisting of

⁹ The number of the hour varied according to the class selected for control purposes. The proper hour was written in the blank provided with pen and ink after the form had been typed.

TABLE 12 (Continued)

Student Teachers										Regular Teachers					
Name	No.	Class I.Q.	S.D. of I.Q.	Subject	Rat-ings	Mean	S.D.	Name	No.	Class I.Q.	S.D. of I.Q.	Subject	Rat-ings	Mean	S.D.
11. Miss B.	18 14	107.79	9.45	Eng. 11A	1 2	9.25 9.29	0.13 0.07	Mrs. C.	15 16	102.75	8.50	Eng. 11A	1 2	9.30 9.32	0.15 0.10
12. Miss F.	23 25	103.88	15.45	Eng. 9B	1 2	9.30 9.08	0.06 0.38	Miss K.	27 27	99.11	11.60	Eng. 9B	1 2	8.92 8.92	1.19 1.10
13. Miss F.	26 27	117.38	13.25	Eng. 9B	1 2	9.25 9.29	0.06 0.21	Miss F.	32	103.15	12.25	Eng. 9B	...	...	1.15
14. Miss K.	29 27	107.73	9.10	Eng. 11B	1 2	9.00 8.98	0.90 1.08	Miss W.	25	106.20	10.70	Eng. 11B	1	8.72	1.85
15. Miss S.	29 27	118.43	13.20	Eng. 11B	1 2	9.26 9.52	0.17 0.14	Mrs. Y.	18 22	105.50	11.16	Eng. 9A	1 2	9.54 9.45	0.16 0.09
16. Mr. M.	26	99.35	11.06	Eng. 10B	...	9.58	0.16	Miss A.	26 24	102.15	10.48	Eng. 10B	1 2	9.36 9.59	0.12 0.13
17. Mr. C.	25 24	104.40	16.15	Biol. 9B	1 2	9.29 9.21	0.15 0.19	Miss I.	27 26	119.44	15.40	Biol. 9B	1 2	9.28 9.28	0.11 0.17
18. Miss G.	13 12	90.93	16.50	Biol. 9B	1 2	9.31 9.53	0.16 0.09	Mr. P.	22 22	95.78	11.60	Biol. 9B	1 2	9.30 9.46	0.07 0.12
19. Mrs. P.	18 17	107.79	7.94	Chem. 12B	1 2	9.29 9.66	0.16 0.14	Mr. S.	23 22	113.58	13.25	Chem. 12B	1 2	9.34 9.48	0.06 0.09
20. Miss P.	21 20	105.92	8.90	Chem. 12A	1 2	9.06 9.57	0.70 0.24	Mr. T.	24 24	108.95	11.04	Chem. 12A	1 2	9.16 9.65	0.67 0.17
21. Mr. S.	30 30	104.60	10.65	Health 12A	1 2	9.26 9.50	0.13 0.17	Mr. M.	30 30	102.17	9.47	Health 12A	1 2	9.51 9.29	0.19 0.13

22. Miss V.	23 23	104.25	9.85	Alg. 9A	1 2	9.22 8.66	0.15 1.16	Mr. L.	25 30	102.30	13.65	Alg. 9A	1 2	9.26 9.37	0.17 0.16
23. Miss A.	30 27	104.67	10.66	Alg. 9B	1 2	9.29 9.57	0.17 0.16	Mr. L.	28 26	103.00	7.85	Alg. 9B	1 2	9.32 9.54	0.13 0.14
24. Miss M.	22 19	103.65	12.75	Alg. 9A	1 2	8.99 9.24	1.17 1.38	Mr. L.	21 21	104.00	12.05	Alg. 9A	1 2	9.50 9.32	0.17 0.10
25. Mr. K.	17 17	115.83	10.75	Geom. 10A	1 2	9.14 9.52	0.21 0.27	Mr. L.	18 18	106.62	12.64	Geom. 10A	1 2	9.33 9.60	0.06 0.14
26. Miss S.	32 29	106.17	10.70	Ger. 10A	1 2	8.88 9.61	1.22 0.22	Miss K.	20 19	112.26	9.92	Ger. 10A	1 2	9.26 9.59	0.10 0.31
Mean		105.30	11.38	.....	.....	.....	.....	.....	.....	104.73	10.28	.....	.....	.....	.....

two in biology, two in chemistry, and one in health. Next in order are four classes in mathematics, consisting of three classes in algebra and one in plane geometry; and finally comes one class in German.

It will be noticed in Table 12 that the number of pupils per class for each rating is given. Also, the mean I. Q. and its standard deviation for each class group are shown. Likewise, the class means for both the first and second rating are presented. Comparable data are shown for the classes taught by the regular teachers. The student and regular teacher may be identified by the sex and the beginning letter of the surname. Thus for the first entry in Row 1, the control class for Miss B in History 11-B is Miss F. This class was selected as a parallel class for the reason that of all of the History 11-B classes taught that semester, the mean I. Q. and standard deviation were most nearly the same as in Miss B's class. For the second student teacher, Row 2, Table 12, the standard deviation of the class taught by the regular teacher (10.20) is the same as the standard deviation of the class taught by the supervised student teacher. At the same time the class I. Q. (104.35) is the nearest one available to that of the class taught by the student teacher (103.39). The same procedure was used in pairing all of the classes.

In all cases the class taught by a regular teacher which had the nearest mean I. Q. and standard deviation was selected as the control class in which the rating scales were administered. In several cases, notably for Rows 13, 15, and 17, it is apparent that the average I. Q.'s. do not match closely. However, it is apparent that in these cases the standard deviations are close together. Only for one student teacher, Row 19, does neither the I. Q.'s nor the standard deviation match closely. The averages of the I. Q.'s. are approximately the same. For the student teachers the average was 105.30, and for the regular teachers, 104.73. The difference between these means was evaluated for its statistical reliability and was found to be too small to indicate that there was a significant difference between them. We may be reasonably sure, therefore, that the two groups were of about the same degree of general intelligence.

There are two other facts that may be brought to the reader's attention concerning the data presented in Table 12. The first is that the second rating is, in all but six cases for the student teachers and seven for the regular teachers, higher than the first rating. The preponderance of cases in which the second rating is higher than the first indicates that a favorable attitude towards both the regular and student teachers developed as the weeks passed. This in turn may be

considered as indicative of the fact that good morale existed in the schools used as training centers for student teachers.

The second fact referred to above is that in not all cases is there a first and second rating. There are first and second ratings for all of the student teachers except one, number 16; but for the regular teachers there are four cases, numbers 5, 6, 13, and 14, where only one rating was administered. This was due to the reluctance on the part of some of the regular teachers to have the pupils rate them.

One of these teachers in response to a second request wrote cryptically across the face of the blank: "I'm sorry, but I do not have time to give these rating scales to my class."

Since it took less than ten minutes to administer the scales, the reason given, lack of time, seems to be but a mere excuse for the fact that she did not believe in the principle of having the pupils rate the teacher—a point of view which she later discussed at length with the writer. Fear that administrative use might be made of the scale very probably played a significant role in the reluctant attitude of some of the teachers, although the regular teachers were assured that such use would not be made. Fear also to face the fact that pupils, if given the opportunity to rate the teacher anonymously, do not always respond in a manner favorable to the teacher may also have had something to do with this attitude. In this respect it is significant to note that three out of the four missing entries on the part of the regular teachers were second ratings. Apparently one frank appraisal of this kind from their pupils was sufficient for these teachers.

In spite of the fact that some of the regular teachers demonstrated a somewhat reluctant attitude to have their pupils rate them, the results show (see Table 13) that the pupils rated them significantly higher on both the first and second rating, than they did the student teachers. For the approximately 600 pupils in each group, the mean for the first rating of pupils taught by the student teachers was 9.13 and for the regular teachers 9.30. The difference, 0.17, was large enough to indicate that a significant difference had been obtained. In other words, these data indicate quite clearly that high-school pupils rank their regular teachers as instructors higher than student teachers at the beginning of a seven weeks' training period. The educational significance of this finding is that student teachers start their work at a disadvantage. The data show, moreover, that pupils have a better attitude towards the regular teachers at the end of the training period. The difference is statistically significant since the difference obtained is 4.28 times the standard error of the

TABLE 13

COMPARISON IN CHANGES IN ATTITUDE TOWARD STUDENT TEACHERS AND REGULAR TEACHERS BETWEEN FIRST AND SECOND RATINGS.
GROUPS MATCHED BY MEAN I.Q.

	Experimental	Control	Obtained Difference	σ Diff.	Critical Ratio	Level of Confidence
Mean I.Q. of Groups in Initial Rating	105.30 $\pm$.46*	104.73 $\pm$.42*	.57 (In favor of Exper.)	.615	.93	.35
S.D. of I.Q.	11.38	10.28	.....	...	...	..
Number (Initial Rating)	621	611	.....	...	...	..
Mean (Initial Rating)	9.13 $\pm$.02*	9.30 $\pm$.01*	.17 (In favor of Control)	.022	7.7	.01
Standard Deviation (Initial Rating)	0.49	0.26	.....	...	...	..
Number (Final Rating)	628	561	.....	...	...	..
Mean (Final Rating)	9.33 $\pm$.01*	9.39 $\pm$.01*	.06 (In favor of Control)	.014	4.28	.01
Standard Deviation (Final Rating)	0.31	0.21	.....	...	...	..

* Standard error.

difference. In other words, there seems to be little doubt that high-school pupils have in general a better attitude towards their regular teachers than towards student teachers.

However, it is noticeable that the attitude of the pupils towards student teachers improved appreciably as time went on, since the critical ratio at the beginning of the training period was 7.7, or 1.8 times higher than it was at the end when the critical ratio was 4.28. A presumably sound deduction from these facts would seem to be that as the pupils become better acquainted with student teachers they tend to like them better. How long, if ever, it would take until they liked them as well, or rated them as high, as the regular teachers is of course not revealed by the data. This question constitutes another problem which conceivably might serve as a very desirable extension of the present study.

The present data also show that both the experimental and control groups rate their teachers significantly higher the second time than they do the first. It is shown in Table 14 that both the experimental and the control groups made significant gains between initial and final ratings. Relatively speaking, the experimental group made the greater gain. It is shown in Table 14 that this group increased its mean rating from 9.13 to 9.33, or .20 scale points; whereas the control group gained only .09 scale points between initial and final ratings. Likewise, the critical ratio for the experimental group was 8.92 as compared with 6.43 for the control group, or 1.39 times as much. In the same interval the attitude of the high-school pupils toward supervised student teachers increased favorably to a greater degree than towards the regular teachers. This may be considered as evidence that in the period devoted to supervised student teaching, the student teachers were considered by the pupils as more and more on a par with the regular teachers as instructors—a certain objective of the course.¹⁰

Attitude of the better and poorer pupils toward student teachers.
—The directions on the scale stated that the pupil should indicate at the teacher's direction whether his standing in class was number 1 or number 2. The directions on the scale made it clear what was meant. Since the regular classroom teachers administered the scale, it is not likely that many pupils encircled the wrong number, although it must be admitted that this was a possibility. Assuming that most of the pupils encircled the number correctly, a dichotomy was ob-

¹⁰ Ryder, *op. cit.*, p. 266.

TABLE 14
DIFFERENCE BETWEEN INITIAL AND FINAL RATINGS FOR EACH GROUP

	Initial Rating	Final Rating	Obtained Difference	σ Diff.	Critical Ratio	Level of Confidence
ATTITUDE TOWARDS TEACHERS—EXPERIMENTAL GROUP						
Number.....	621	628	.....	....	...	..
Mean.....	9.13 $\pm$.02*	9.33 $\pm$.01*	.20 (In favor of final rating)	.0224	8.92	.01
S.D.....	0.49	0.31	.....	....	...	..
ATTITUDE TOWARDS TEACHERS—CONTROL GROUP						
Number.....	611	561	.....	....	...	..
Mean.....	9.30 $\pm$.01*	9.39 $\pm$.01*	.09 (In favor of final rating)	.014	6.43	.01
S.D.....	0.26	0.21	.....	....	...	..

* Standard error.

tained between the better and poorer pupils. The fact that more pupils in both the student teachers' classes and the regular teachers' classes encircled number 2 than number 1 may be considered as evidence that the pupils indicated their true standing in class.

Not all the pupils indicated their standing in class, but the majority of them did. In the classes taught by supervised student teachers, approximately two-thirds of the scales were thus marked. In the regular teachers' classes approximately five-sixths of the pupils indicated their standing in class.

The differences shown in Table 15 indicate that there is very little difference in the attitude of the better and poorer pupils. The differences obtained were not large enough to be considered statistically significant in either the initial or the final rating. However, since both the differences obtained indicated a slightly better rating by pupils who were doing the best work in class, it may be said that the better pupils probably tend to have a better attitude toward student teachers than the poorer pupils. It is noticeable that the final rating is higher than the initial rating for each group. The difference between the initial and final rating for the better pupils is .25 scale points (9.38-9.13) and for the poorer pupils, .16 scale points (9.23-9.07). It was found that the critical ratio between the first and second ratings of the better pupils was 2.97, which indicates that we may be practically certain that the better pupils will rate the student teachers higher the second time than the first. The critical ratio between the initial and final ratings for the poorer pupils was 1.80, which indicates that we cannot be certain that the poorer pupils will give the higher rating the second time. Both critical ratios are actually spuriously low, since neither takes into account (a) any possible correlation between ratings and school marks and (b) the regression effect.¹¹

Comparable data are shown in Table 16 for the regular teachers. It is of interest to note that these results show that in neither rating is the difference large enough to be considered statistically significant. In the first rating the obtained difference was somewhat in favor of the better pupils having the better attitude, while in the second rating the poorer pupils gave the higher rating. Hoshaw found in his investigation of experienced teachers that standing in class did not affect the pupils' attitude. He says, "The results of this investigation showed that on the whole the grade a pupil gets in class does not

¹¹ Philip J. Rulon, "Problems of Regression," *Harvard Educational Review*, XI (1941), 213-223.

TABLE 15
ATTITUDE OF BETTER PUPILS TOWARD SUPERVISED STUDENT TEACHERS COMPARED WITH THAT OF THE POORER PUPILS

	Better Pupils	Poorer Pupils	Obtained Difference	σ Diff.	Critical Ratio	Level of Confidence
Number (Initial Rating) . . .	181	210	.....	...	...	..
Mean (Initial Rating)	9.13 $\pm$.055*	9.07 $\pm$.063*	.06 (In favor of Better Pupils)	.084	.73	.47
S.D. (Initial Rating)	.740	.919	.....	...	...	..
Number (Final Rating)	148	212	.....	...	...	..
Mean (Final Rating)	9.38 $\pm$.060*	9.23 $\pm$.063*	.15 (In favor of Better Pupils)	.089	1.68	.09
S.D. (Final Rating)	.730	.912	.....	...	...	..

* Standard error.

affect his attitude, as here measured, to any extent."¹² The results shown in Table 16 confirm Hoshaw's conclusion.

Tendency for better pupils to have the better attitude.—Although none of the differences obtained was large enough to indicate statistical significance, there seems to be a factor that favors student teachers which is not apparent in the case of the regular teachers. In Table 15 it was seen that the higher rating toward student teachers was returned both times by the better pupils. Not only is there consistency in the better pupils' returning the higher rating, but the second rating is sufficiently higher than the first to indicate that there is a tendency for the better pupils to make more improvement in their attitude than the poorer pupils towards student teachers. For the regular teachers there is practically no difference. (See Table 16.) Even though the difference in the rating between the better and poorer pupils in the case of the supervised student teachers is not statistically significant, it is sufficiently high on the second rating to indicate that there may be a tendency for all similarly selected better pupils to have a better attitude towards student teachers than the poorer pupils.

A reasonable explanation for the tendency of better pupils to rate student teachers higher than poorer pupils may be found in the fact that the poorer pupils are likely to attribute their standing in class at the end of the training course to the student teacher. In the author's experience of eighteen years as a supervisor of student teachers in co-operative schools, the instances in which criticism from pupils or parents occurred concerning student teachers were always associated with pupils who had received lower marks under the student teacher than they had received under the critic teacher before the student teacher assumed the responsibility of instruction. For this reason, the author has found that it is a wise precaution to insist that the critic teacher check each mark and give it his official sanction before it is entered in the record or placed on the pupil's report card.

ATTITUDE OF HIGH-SCHOOL PUPILS TOWARD THE SUBJECT TAUGHT BY SUPERVISED STUDENT TEACHERS

An investigation of the pupils' attitude towards the subject taught by supervised student teachers was considered desirable for several reasons. It was assumed that creating a favorable attitude towards

¹² Hoshaw, *op. cit.*, p. 246.

TABLE 16
ATTITUDE OF BETTER PUPILS TOWARD REGULAR TEACHERS COMPARED WITH THAT OF THE POORER PUPILS

	Better Pupils	Poorer Pupils	Obtained Difference	σ Diff.	Critical Ratio	Level of Confidence
Number (Initial Rating) . .	279	214	.....	...	...	..
Mean (Initial Rating) . . .	$9.30 \pm .017^*$	$9.28 \pm .034^*$	.02 (In favor of Better Pupils)	.039	.51	.61
S.D. (Initial Rating)	.283	.503	.....	...	...	..
Number (Final Rating) . . .	282	177	.....	...	...	..
Mean (Final Rating)	$9.36 \pm .025^*$	$9.37 \pm .053^*$	.01 (In favor of Poorer Pupils)	.058	.17	.87
S.D. (Final Rating)	.414	.711	.....	...	...	..

* Standard error.

the subject taught was perhaps the most important accomplishment the school could hope for in regard to subject matter. If it should be found that the same subject or subjects are liked better when taught by regular teachers than when taught by the student teachers, certain conclusions concerning the price the co-operating schools are paying for permitting the university to use the schools for this purpose may be drawn. If, on the other hand, it should be found that pupils like the courses better when taught by supervised student teachers, opposite and very interesting inferences might be made. Moreover, if no true or significant difference is found, a logical conclusion is that the pupils are not harmed or injured in any measurable degree by having student teachers as instructors. Because the school is fundamentally concerned with creating a favorable attitude on the part of pupils towards the subjects taught, the answer to these questions is of prime importance.

The data for this part of the study were obtained from the pupils taught by twelve supervised student teachers during the first semester of the academic year 1936-37. The instrument used for obtaining the data was the Silance and Remmers Scale for Measuring Attitude Toward any Subject, Form A.¹³ The validity of this scale has been established by Silance and Remmers. The correlation between the generalized scales toward any institution and Thurstone's specific attitude scales was reported by Remmers to be .83.¹⁴ Remmers says of this scale, "The scale constructed by Ella B. Silance now makes possible the measurement of attitude toward any subject in the Curriculum."¹⁵

The scale was administered twice: the first time after the student teachers had taught for a few days and the second time shortly after the student teachers finished the course, approximately seven weeks later. The student teachers had taught the subject every day in the interval. The attitude scale was administered by the classroom teachers after having received uniform instructions from the supervisor of tests and measurements.

The subjects taught included English, social studies, biology, and algebra. Five student teachers taught classes in English, four of which were in grammar and composition. The fifth class, or English

¹³ Ella B. Silance and H. H. Remmers, "An Experimental Generalized Master Scale. A Scale to Measure Attitude Toward Any School Subject." *Studies in Higher Education*, XXVI, 84-87. Bulletin of Purdue University, Vol. XXV, No. 4. Lafayette, Indiana: Purdue University, 1934.

¹⁴ *Ibid.*, p. 30.

¹⁵ *Ibid.*, p. 9.

TABLE 17
ATTITUDE TOWARDS ANY SUBJECT
(Experimental and Control)

	Experimental	Control	Obtained Difference	σ Diff.	Critical Ratio	Level of Confidence
Number (Initial Rating) . . .	210	228	.....	....	...	..
Mean (Initial Rating)	$8.03 \pm .100^*$	$8.09 \pm .078^*$	.06 (In favor of control)	1.003	.06	.95
S.D. (Initial Rating)	1.449	1.179	.....	....	...	..
Number (Final Rating) . . .	242	247	.....	....	...	..
Mean (Final Rating)	$8.14 \pm .087^*$	$8.25 \pm .062$	.11 (In favor of control)	.11	1.00	.31
S.D. (Final Rating)	1.356	.973	.....	....	...	..

* Standard error.

11A, was a course in American literature. The five classes in the social studies group consisted of three in American history (History 11B), one in European history (History 10A), and one in civics (Civics 9B). The other two classes were first semester biology (Biology 9B) and second semester algebra (Algebra 9A). In all, 242 pupils in the experimental group and 247 in the control registered their attitude toward the subject on the scale.

Difference in attitude for all subjects. A distribution of the pupils' ratings in all subjects was made for the pupils taught by the supervised student teachers. Similarly a distribution was made of the ratings of the groups of pupils taught by the regular teachers. As shown in Table 17, 210 pupils in the experimental group and 228 in the control rated the school subjects taught by the student teachers at the beginning of the training period; likewise, 242 and 247 pupils in each group respectively expressed their attitude toward the subject on the scale at the end of the training period. The reason why there were more pupils involved in the second rating is that there were more complete returns made for the second rating.

Two facts are brought to light in Table 17. The first is that the differences are so small that they are statistically insignificant, and the second is that both the small differences are in favor of the control or regular teachers. The fact that both of the small differences are in favor of the control group may indicate that there is at least a tendency for the pupils to regard the subjects somewhat more highly when taught under the regular teachers than when taught under student teachers. However this may be, the fact remains that neither difference is statistically significant at or above the 5 per cent level. Although the results are inconclusive, the best deduction seems to be that there is no real or true difference in attitude towards the subject taught between pupils in the experimental and in the control groups.

The social studies. The largest group of pupils who indicated by means of the scale their attitude towards the subject was the group in the social studies (history and civics). There were approximately 109 pupils in the student teachers' classes from whom final ratings were obtained and 110 pupils in the regular teachers' classes.

It is shown in Table 18 that in neither the initial nor the final rating was a significant difference obtained in attitude towards social studies between pupils in the student teachers' and in the regular teachers' classes. These results may be taken to mean that the difference obtained was not large enough to indicate that the pupils in the regular teachers' classes would always rate the subject higher

TABLE 18
ATTITUDE OF EXPERIMENTAL AND CONTROL GROUPS TOWARDS SOCIAL STUDIES

	Experimental	Control	Obtained Difference	σ Diff.	Critical Ratio	Level of Confidence
Number (Initial Rating)	101	109	.....	...	...	..
Mean (Initial Rating)	7.88 $\pm$.153*	8.12 $\pm$.105*	.24 (In favor of control)	.187	1.28	.20
S.D. (Initial Rating)	1.536	1.091	.....	...	...	..
Number (Final Rating)	109	110	.....	...	...	..
Mean (Final Rating)	8.23 $\pm$.098*	8.31 $\pm$.083*	.08 (In favor of control)	.128	.625	.53
S.D. (Final Rating)	1.028	.867	.....	...	...	..

* Standard error.

than pupils taught by student teachers. Although both of the differences obtained for the initial and final ratings were in favor of the pupils taught by the regular teachers, the data show that there was, nevertheless, some indication that the pupils in the student teachers' classes tend to improve in their attitude towards the subject just as much as, if not slightly more than, the pupils in the other group. The data show that the obtained difference for the final rating was less favorable to the regular teachers than in the first rating. The gain made between initial and final ratings in the supervised student teachers' classes was .35 scale points (8.23-7.88), whereas the gain in the regular teachers' classes was .19 scale points. The relatively greater improvement made by the pupils in the student teachers' classes between the first and second ratings than by the pupils in the regular teachers' classes made during the same time indicates that at least the assignment of student teachers to the social studies classes does the pupils no harm in respect to their attitude towards the subject.

English. As shown in Table 19, the data concerning the pupils' attitude toward English show in the first place that significant differences were not obtained between pupils taught by regular teachers and pupils taught by student teachers. Concerning the small differences obtained for the sample, however, there are several points which deserve attention and comment. The first is that English is the only subject investigated in which the obtained mean for the final rating is less than that of the initial rating for the student teachers. The loss amounts to .13 scale points (8.32-8.19). When evaluated for its statistical significance, it was found that this difference was not statistically significant. However, the evidence obtained indicates that the pupils' attitude towards English in the student teachers' classes tends to become worse instead of better.

There are at least two factors which should be considered in attempting to account for this apparently poorer attitude at the end of the training period. The first is that all these courses except one were in grammar and composition. This fact alone would not account for the apparent retrogression in the pupils' respect for the course were it not for two other contributing factors. The first is that the student teachers were inadequately prepared to teach grammar, and the second is the heavy reliance placed upon workbooks. In regard to the latter it should be said that the student teachers would not have leaned so heavily upon workbooks if they had not already constituted the bulk of the course before the student teachers assumed the responsibility of instruction. However, lack of a college course

TABLE 19
ATTITUDE OF EXPERIMENTAL AND CONTROL GROUPS TOWARDS ENGLISH

	Student Teachers	Control Teachers	Obtained Differences	σ Diff.	Critical Ratio	Level of Confidence
Number (Initial Rating) . .	85	96	.....	...	...	..
Mean (Initial Rating)	8.32 $\pm$.127*	8.17 $\pm$.119*	.15 (In favor of experimental)	.174	.86	.39
S.D. (Initial Rating)	1.174	1.174	.....	...	...	..
Number (Final Rating)	89	85	.....	...	...	..
Mean (Final Rating)	8.19 $\pm$.134*	8.27 $\pm$.163*	.08 (In favor of control)	.211	.37	.70
S.D. (Final Rating)	1.273	1.010	.....	...	...	..

* Standard error.

in grammar contributed to the temptation to keep the pupils busy in performing numerous written exercises and in taking the practice and final tests provided in the detailed laboratory plan as outlined in the workbook. The critic teachers encouraged the student teachers to keep the pupils busy with workbooks since in this way but little oral explanation was required.

If three semesters of grammar beyond that received in the seventh and eighth grades are necessary for high-school pupils, then it would appear that prospective teachers should be required to take at least a three-semester-hour course in English grammar at the University in preparation for teaching. Such is not the case, however. It is possible in Indiana to obtain a license to teach English with no course in grammar whatever beyond that obtained in high school. The state requirements for a license in English specify ten semester hours in oral and written composition and fifteen semester hours in literature.¹⁶ No course in grammar is required. Moreover, at Purdue University most of the students who plan to teach English have had only one three-semester-hour course in written composition because of the operation of an exemption plan.¹⁷

The result is that many of the student teachers are not as familiar with the principles of grammar as they should be in order to develop the subject properly with specific examples and oral explanation. If this condition is to be remedied, more attention should be given to the subject in college courses intended for prospective teachers. The conclusion seems inevitable that either the amount of time given to grammar in the high schools should be reduced or more attention should be given to it in college courses for prospective teachers.

The workbook itself in the hands of a student teacher may be a major cause for the tendency on the part of the pupils to develop an unfavorable attitude towards the subject of English grammar and composition. The so-called laboratory method of teaching grammar may easily become just another form of busy work, which is not likely to create in high-school pupils a favorable attitude. Not student teachers alone, but all English teachers who follow the prescribed lessons in an English workbook are influenced by the ground-to-be-covered theory. The argument presented by teachers who are

¹⁶ *Educational Bulletin* (State of Indiana) No. 94, p. 25. Indianapolis, Indiana: Department of Education, 1937.

¹⁷ "Students who have received a grade of H or A in English 1 (English Composition) and grades H, A, or B in two subsequent courses may, with approval of the head of the English Department, substitute for English 31 (Expository Writing) an advanced course in English or in another department," p. 363. *Bulletin of Purdue University. Catalogue Number*, Vol. XLII. Lafayette, Indiana: Purdue University, 1942.

TABLE 20
ATTITUDE OF EXPERIMENTAL AND CONTROL GROUPS TOWARDS BIOLOGY

	Experimental	Control	Obtained Difference	σ Diff.	Critical Ratio	Level of Confidence
Number (Initial Rating) . .	24	23	.....	...	...	..
Mean (Initial Rating)	$7.62 \pm .353^*$	$7.64 \pm .298^*$	.02 (In favor of control)	.462	.04	.96
S.D. (Initial Rating)	1.732	1.433	.....	...	...	..
Number (Final Rating)	21	22	.....	...	...	..
Mean (Final Rating)	$6.94 \pm .502^*$	$7.80 \pm .322^*$	.86 (In favor of control)	.506	1.69	.09
S.D. (Final Rating)	2.302	1.514	.....	...	...	..

* Standard error.

adherents of this theory is that since the workbook has been purchased by the pupils, teachers have not done their full duty unless every lesson has been taught. The result is that pupils are kept so busy completing written drills and exercises that little school time is available for oral or written compositions. In the school where most of the student teaching was done, a departmental regulation has been recently put into effect that a minimum of six written compositions is required per semester. The rule was passed because it was discovered that many of the teachers did not teach composition at all. Their time was being completely occupied in attempting to cover all the prescribed lessons in the English workbook.

Biology. The number of pupils who gave their reactions to the statements on the rating scale in regard to biology was small. There was only one student teacher assigned to teach a class in biology during the semester when a record of the pupils' attitude towards the subject was secured. There were only 24 pupils in this class and their reactions were compared with those of 23 pupils under a regular teacher. The number of pupils whose attitude towards biology was measured is, therefore, not as large as is desirable for the type of statistical evaluation used.

Table 20 shows that in both the first and second ratings the differences obtained were in favor of the group taught by the regular or control teacher. The first rating was practically even for the two groups. However, for the final rating the results were much more favorable for a better attitude in the regular teacher's class. The level of confidence that the null hypothesis can be rejected is much higher than in the first rating. It is 9 per cent in the last rating and 96 per cent in the first. The trend for the pupils to dislike biology when taught by a student teacher is similar to that discovered for English. The difference, it is true, is not significant, and therefore it cannot be assumed that for every sample the results would favor the pupils taught by the regular teacher. However, the difference is sufficiently large to indicate that there may be something wrong with the teaching of biology by Purdue student teachers. Probable reasons for this have been presented in the complete study.¹⁸ Further explanation appears unnecessary here except to say that the results discussed in the complete study in regard to achievement in biology are in agreement with results obtained in respect to the pupils' evaluation of the subject as taught by student teachers.

Algebra. The same criticism concerning the inadequacy of the sample in biology applies to algebra also. There was only one class

¹⁸ Ryder, *op. cit.*, p. 122.

TABLE 21
ATTITUDE OF EXPERIMENTAL AND CONTROL GROUPS TOWARDS ALGEBRA

	Experimental	Control	Obtained Difference	σ Diff.	Critical Ratio	Level of Confidence
Number.....	23	30	.....	...	...	..
Mean.....	$8.51 \pm .275^*$	$8.35 \pm .180^*$	.16 (In favor of experimental)	.328	.49	.62
S.D.....	1.318	.983	.....	...	...	..

* Standard error.

in algebra taught by a student teacher during the semester when the pupils were asked to indicate their attitude towards the subject by means of the Silance and Remmers attitude scale. This was a 9A, or second semester, algebra class.

The first rating for the student teacher was not returned by the critic teacher, but fortunately the more important final rating was. The final comparison is shown in Table 21.

There were 23 pupils in the student teacher's class and 30 in the control class. Table 21 shows that the pupils in the student teacher's class rated the subject higher at the end of the training period than did the pupils in the control class. The level of confidence that the difference was statistically significant is very low, 62 per cent. However, algebra was the only subject in which the obtained difference between the final ratings was in favor of the group taught by the student teachers. It is interesting to note too that the more favorable attitude towards the subject expressed by the pupils in this student teacher's class is in harmony with the findings in regard to achievement. It will be recalled that algebra was the only subject except arithmetic in which a significant difference in achievement was found. In algebra it was in favor of the group taught by supervised student teachers.¹⁹ The similarity in results found in respect to both attitude and achievement lends support to the conclusion that high-school pupils have a high regard for those subjects in which they are making noticeable progress.

SUMMARY

From a large sample of more than 600 pupils, matched on the basis of the mean I. Q. and subject at the same grade level, with approximately the same number of pupils taught by the regular high-school teachers, a true or significant difference in attitude in favor of the regular teachers was found. The more favorable attitude of high-school pupils towards the regular teachers existed not only at the beginning of the training period but also at the end.

However, it was found that the attitude of the pupils toward student teachers improved significantly during the training period. In other words, it was found that pupils taught the academic subjects by student teachers from Purdue University are practically certain to have a better attitude towards the student teachers at the end of the training period than they have in the beginning. The acquaintance

¹⁹ See chapter III, pp. 51-55.

factor probably has a great deal to do with this improved attitude, but at the same time it is perfectly clear that the student teachers have improved in the pupils' opinion during the training period. The data show that the pupils' attitude toward the regular teachers improved also during the same period of time, but not so much as toward the student teachers. Almost twice as much improvement in attitude was noted for the student teachers as for the regular teachers. This fact indicates that the student teachers, as they gained experience through their supervised student teaching course, were approaching the point where the difference in the pupils' attitude between them and the regular teachers was becoming less pronounced.

In the last part of the chapter the pupils' attitude toward subjects taught by student teachers was discussed. The means used to obtain objective data was a validated and reliable scale for measuring attitude towards any school subject. The scale was administered to 200 pupils taught by student teachers and to the same number of pupils in parallel classes taught by regular high-school teachers. The scale was administered at the beginning and the end of the supervised student teaching period of seven weeks' duration in order to measure any change in attitude that may have taken place. The results showed, first, that the pupils' attitude towards the subject was no worse at the end of the training period than at the beginning. It was, in fact, slightly higher for the group of pupils measured. Approximately the same amount of improvement occurred in the parallel classes. Neither difference was statistically significant. The results showed, second, that high-school pupils have about the same attitude towards the subject under student teachers as under the regular teachers. The results were not statistically significant. There was, however, a tendency shown in the final rating for the pupils to have a slightly better attitude in all subjects except algebra when taught by the regular teachers than when taught by student teachers.

CHAPTER VI

FURTHER STUDIES IN THE ATTITUDE OF HIGH-SCHOOL PUPILS TOWARD SUPERVISED STUDENT TEACHERS

The studies described in the preceding chapter should be extended in order to determine (1) whether or not the pupils' estimate of the student teachers' ability increased during the training period as regards traits known as to be associated with success in teaching, (2) to discover what percentage of the pupils had a favorable attitude toward student teachers, and (3) to find out what traits in student teachers were either liked or disliked by the pupils. The discussion that follows will be divided into two parts. In the discussion immediately following, the first of the above-mentioned problems is discussed. In the last part of the chapter the results of a survey of pupils' likes and dislikes of student teachers are presented.

IMPROVEMENT IN THE ABILITY OF STUDENT TEACHERS BETWEEN FIRST AND LAST WEEKS OF STUDENT TEACHING

The Purdue Rating Scale for Instructors was given to the pupils taught by 22 student teachers during the second semester of 1935-36. There were approximately 600 pupils taught by the student teachers from whom initial and final ratings were obtained. The ratings were obtained by the classroom teachers who administered the scale under uniform directions. The purpose of giving the pupils the opportunity to rate the student teachers was both pedagogical and experimental. The pedagogical purpose was to enable the student teachers to study the pupil ratings on the ten desirable professional qualities listed on the scale with a view to self-improvement. The experimental purpose was to discover how much improvement could be obtained through training between the first and last week of student teaching. The first rating was given at the end of the first week of student teaching—after a period of three weeks of observation and participation in the same class. The second rating was taken during the seventh week of student teaching, or at the end of the training period. The data having been collected, the gains or losses for the rating scale as a whole, and for the separate traits comprising the scale, were then computed. The various classes which the student teachers taught were distributed as follows: eight classes in English,

four in history, three in arithmetic, two in algebra, one in geometry, one in biology, one in chemistry, one in economics, and one in civics.

Validity and reliability of the measuring instrument. The Purdue Rating Scale consists of ten traits associated with success in teaching. The ten traits comprising the scale were enumerated in Chapter IV, p. 66, and are listed again in Table 22 together with the results obtained from the group of student teachers at the beginning and the end of the course in student teaching.

As stated in Chapter IV the reliability of the scale was found to lie between .60 and .85. The authors of the scale state, "For this scale reliability is synonymous with validity."¹

It was assumed that the Purdue Rating Scale measured high-school pupils' estimates of the ability of student teachers. This assumption was made by Remmers, one of the authors of the scale. In determining the relationship between students' marks and students' attitude toward instructors, he utilized the ratings of eleven instructors—"seven Purdue University seniors who had just completed their practice teaching in local high schools and four college instructors."²

The Purdue Rating Scale for Instructors is designed to measure student attitudes toward the instructor in terms of the ten traits known to be closely associated with success in teaching.³ From the point of view of improving instruction, this instrument may be used (1) to enable the instructor to see himself as the pupil sees him and (2) to cause improvement to come about through conferences on weak traits and by suggestions concerning various ways to effect improvement.

Improvement made in traits known to be associated with success in teaching. The improvement made in the pupils' estimate of the student teachers is shown in Table 22 and Figure 6. For all traits combined a significant difference between the initial and final rating was obtained. The difference obtained for the scale as a whole was more than three times the standard error of the difference. The critical ratio was 3.82. This result indicates that other groups of student teachers from Purdue University under similar supervisory

¹ G. C. Brandenburg and H. H. Remmers, *Manual for the Purdue Rating Scale of Instructors*, p. 14. Lafayette, Indiana: Lafayette Printing Company, 1928.

² H. H. Remmers, "The Relationship Between Students' Marks and Student Attitude Toward Instructors." *School and Society*, XXVIII (December, 1928), p. 75.

³ H. H. Remmers, "The College Professor as the Student Sees Him." *Studies in Higher Education*, XI, p. 16. Bulletin of Purdue University, Vol. XXIX, No. 6. Lafayette, Indiana: Purdue University, 1929.

TABLE 22
CHANGES IN PUPIL RATINGS OF STUDENT TEACHERS ACCORDING TO PURDUE RATING SCALE

Traits Rated	Initial Rating (Mean and σ_M)	Final Rating (Mean and σ_M)	Obtained Difference	σ Diff.	Critical Ratio	Level of Confidence
All Traits Combined	76.39 $\pm$.201 N = 560	77.53 $\pm$.220 N = 604	1.14 (In favor of the final rating)	.298	3.82	.01
Interest in Subject (Trait 1)	79.57 $\pm$.589 N = 558	80.21 $\pm$.534 N = 604	.64 (In favor of the final rating)	.795	.80	.42
Sympathetic Attitude (Trait 2)	78.34 $\pm$.734 N = 564	79.22 $\pm$.681 N = 604	.88 (In favor of the final rating)	1.00	.88	.38
Fairness in Grading (Trait 3)	77.95 $\pm$.758 N = 561	78.91 $\pm$.691 N = 607	.96 (In favor of the final rating)	1.02	.94	.35
Liberal and Progressive Attitude (Trait 4)	79.65 $\pm$.694 N = 560	80.80 $\pm$.590 N = 603	1.15 (In favor of the final rating)	.91	1.26	.21
Presentation of Subject Matter (Trait 5)	71.20 $\pm$.813 N = 552	73.62 $\pm$.744 N = 607	2.42 (In favor of the final rating)	1.10	2.21	.03
Sense of Proportion and Humor (Trait 6)	72.80 $\pm$.793 N = 556	75.78 $\pm$.741 N = 607	2.98 (In favor of the final rating)	1.08	2.85	.01 ^a
Self-Reliance and Confidence (Trait 7)	67.96 $\pm$.801 N = 556	70.60 $\pm$.761 N = 608	2.64 (In favor of the final rating)	1.10	2.40	.02
Personal Peculiarities (Trait 8)	75.25 $\pm$.765 N = 550	76.45 $\pm$.724 N = 607	1.20 (In favor of the final rating)	1.05	1.14	.25
Personal Appearance (Trait 9)	86.70 $\pm$.506 N = 565	86.34 $\pm$.540 N = 608	.36 (In favor of the initial rating)	.74	.49	.62
Stimulating Intellectual Curiosity (Trait 10)	72.69 $\pm$.776 N = 576	75.49 $\pm$.737 N = 589	2.80 (In favor of the final rating)	1.07	2.61	.01

conditions will usually be considered better instructors by the pupils at the end of the training period than at the beginning. So long as instructional and supervisory conditions which operated when these measurements were taken remain constant or are improved, then there is little doubt that high-school pupils will consider the student teachers better instructors at the end of the course than at the beginning.

Since development in skill and ability as teachers is one of the principal objectives of the course, it is gratifying to discover that this objective has been obtained.⁴ In so far as pupil estimate of the student teachers' ability reflects the attitude of the pupils, the results show a significant improvement in attitude. It is of interest to note also that these results are in agreement with those obtained by another investigation,⁵ and with those reported in Chapter V of the present study. (See Table 14.)

Examination of the several traits separately indicates (1) that the obtained differences between the means are all in favor of the second rating except one, personal appearance, and (2) that the critical ratios for four of the traits are sufficiently high to indicate with virtual certainty that the rating at the end of the course will be higher, provided similar supervisory and experimental conditions operate. The four traits in which the chances are very high that the difference is greater than zero are (1) Presentation of Subject Matter, (2) Sense of Proportion and Humor, (3) Self-Reliance and Confidence, and (4) Stimulating Intellectual Curiosity. These are all important professional traits. In order of importance, according to the judgment of college students, these traits have the following ranks on a scale of 1 to 10:⁶

<i>Trait</i>	<i>Rank</i>
Presentation of Subject Matter	1
Stimulating Intellectual Curiosity	2
Self-Reliance and Confidence	4
Sense of Proportion and Humor	8

It is a matter of importance that the greatest progress was made on three of the most important traits on the scale. This shows that

⁴ See list of "Objectives in Bulletin to Student Teachers," Ryder, *op cit.*, p. 318.

⁵ W. D. Ward, H. H. Remmers, and N. T. Smalzried, "The Training of Teaching Personality by Means of Student Ratings." *School and Society*, LIII (February, 1941), 189-92.

⁶ Remmers, *op. cit.*, p. 19.

the student teachers were making greatest improvement during their period of training in those qualities known to be most important among the the traits that make for success in teaching.

It is of interest to note, too, that the trait that received the highest ranking was Personal Appearance. (See Figure 6.) There are two probable reasons for this: (1) high-school pupils, being at the

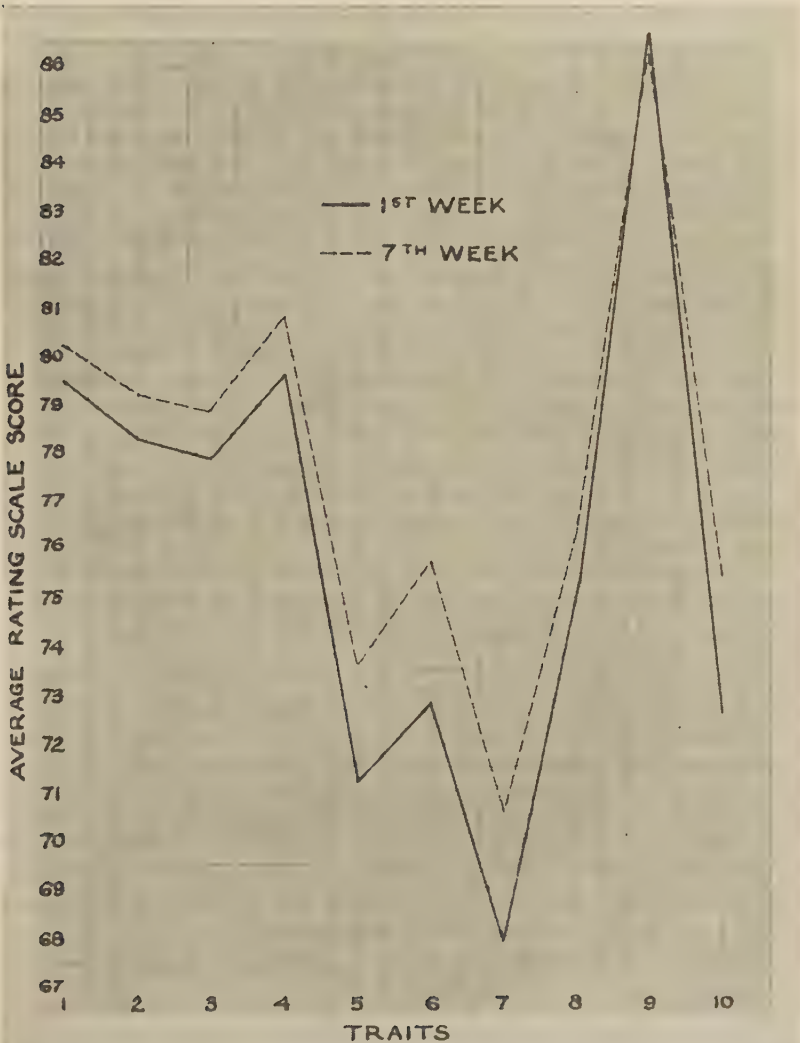


Fig-6. AVERAGE TRAIT SCORES OF STUDENT TEACHERS COMPARED FOR 1ST. & 7TH WEEK OF STUDENT TEACHING

adolescent period of development, are very conscious of personal appearance and are perhaps better judges of this trait than they are of some of the more subtle ones associated with success in teaching, and (2) student teachers are of an age when their personal appearance is naturally at its best because of the full bloom of youth. Then, too, proper grooming and neatness in personal appearance were stressed in the training program by the University supervisor of student teaching. This trait ranked highest in both ratings. It is, in fact, the only one in which the final rating is not higher than the first.

In Figure 6 the fact is brought out clearly that progress was made in all traits except Personal Appearance, which, none the less, ranked much higher than any of the others. The curves are almost identical in shape, which is an indication that rather uniform improvement was made in all the other traits. Since the scale is designed to measure attitudes toward the instructor in terms of traits known to be associated with success in teaching, it is clear from the results obtained that the pupils have a better attitude towards supervised student teachers at the end of the course than they have at the beginning. Further evidence that the majority of the pupils have a favorable attitude towards supervised student teachers is presented in the following section.

PUPIL ATTITUDE TOWARD STUDENT TEACHERS AS DETERMINED BY ANALYSIS OF WRITTEN STATEMENTS

In order to permit the pupils to evaluate the student teachers in their own way, from their own point of view, unhampered by the rigid form of an attitude scale or a rating scale, they were asked at the end of the training period to write a composition on either of the following subjects: Why I Liked the Student Teacher I Had This Semester or Why I Did Not Like the Student Teacher I Had This Semester. The pupils who wrote these compositions were asked not to sign their names, and they were also assured that the exercise would have no effect upon their marks. The pupils of the twenty-two student teachers designated in the first section of the present chapter wrote the compositions on the back of the Purdue Rating Scale immediately after the second rating of the student teacher. In all, 530 compositions were written.

These compositions were read and analyzed by the writer. The analysis consisted in determining whether the writer of the composition was (1) favorable, (2) indifferent or neutral, or (3) unfavor-

able toward the student teacher. Detailed analysis of the pupils' compositions consisted in listing for each composition (1) the favorable statements and (2) the unfavorable. These statements were then classified under more comprehensive headings by the writer, and his judgment was later validated by a competent critic teacher,⁷ a child psychologist,⁸ and a university supervisor of student teachers.⁹ Each of these persons read the compositions and made his judgment independently after the author had explained the procedure and analyzed several of the compositions in his presence. The work was divided between the critic teacher and the child psychologist. The former read the compositions concerning 14 of the student teachers, and the child psychologist the compositions on the remaining eight. None of the judges had any part or interest in the experiment except that indicated. They were chosen because the writer believed them to be competent judges by virtue of their training and interest in teacher education. Moreover, since none of them had any part in the original experiment, it was unlikely that their judgment would be biased.

Validity of the procedure. It must be stated frankly that the procedure of determining from reading the pupils' compositions whether or not the pupils were favorable or indifferent towards student teachers is a subjective one, and, as such, is open to the criticisms that have been made frequently in educational circles concerning this method. A few of the objections that might be raised, aside from the fact that various readers would probably not agree closely upon the interpretation of the pupil writers' attitudes, are the following:

First, there is the possibility that the pupils were not sincere in what they wrote; that is, that they have not stated what they really thought or felt about the student teachers. One who has read the compositions discerningly, however, soon becomes convinced of their sincerity. The fact that the pupils did not sign their names probably had some effect in eliciting frank statements, although it is possible that, unless the pupil disguised his handwriting, the identity of the writer could be determined by the teacher.

Second, granting the sincerity of the pupils, the categorizing of the compositions into favorable, unfavorable, and neutral classifications was also a subjective process. One could not always be certain of the real attitude of the pupils towards the student teacher because

⁷ Mrs. Lydia Gowdy, critic teacher and social studies teacher, West Lafayette Junior High School.

⁸ Mrs. Genevieve Scott, Ph.D., Ohio State University.

⁹ Mr. I. W. Brasch, D.Ed., Cincinnati University.

of the ambiguity of language or the conflicting nature of the statements. This was particularly true of the compositions placed in the neutral classification.

Third, the classification of the attitude statements under such headings as "Efficiency in Presenting Material," "Willingness to Help the Pupil," "Does not Understand Pupils," etc., took form as the compositions were read and similarity in the statements made were noticed. Like statements were first given a heading or classification which seemed to comprehend the attitude statements placed under it. The process, however, was subjective, since the determining of whether a certain statement belonged to "Willingness to Help the Pupil" or "Does not Understand Pupils," for example, was a matter of human judgment. Later this distribution of attitude statements was validated by asking three other persons, as noted above, to read the compositions and, working independently, to make a distribution of the attitude statements under the headings provided by the author. The degree of correspondence with the author's appraisal was expressed in terms of a correlation coefficient.

ILLUSTRATIVE EXAMPLES OF PUPILS' COMPOSITIONS CONCERNING STUDENT TEACHERS

Several of the compositions in the favorable, neutral, and unfavorable categories are quoted below to illustrate their nature. The compositions in the favorable category are among the most favorable, according to the author's judgment. Likewise, those illustrating a neutral attitude are typical of those placed in this category. In general, the latter reflect a favorable attitude toward the particular student teacher, but an unfavorable attitude towards student teachers as a class.

Compositions expressing a favorable attitude. The first composition quoted was written by a junior in an American history class.

I liked Mr. H. . . . very much. I liked him because he was always courteous and polite. He was very friendly and did not act as if he were bored with his task. His presentation of the subject was good. He always explained the different parts of the lesson clearly. He was always neat in appearance which is more than can be said for some of the regular teachers. His tests were neither too hard nor too easy, and he was very fair in his grading. He seemed to be "right at home" in the classroom and was not at all self-conscious. He made the subject seem more interesting even than the regular teacher. Indeed, I think he was a very good teacher in all respects.

The composition here presented was written by a pupil in a biology class taught by a student teacher, a Mr. S. . . .

I liked the student teacher I had in this class because he was always ready to assist you when you were stuck on a subject but did not show it right out. He had you investigate it which made you remember better what he was teaching. I liked him also because he took things gradually and taught each detail perfectly. It seemed funny that he took things so much slower than our regular teacher, but he taught us more. He was always ready to assist us on outside work. One night he took us to the Purdue Biology Building and let us stay until he had shown us everything that we needed to see and lot more. He was one *swell* fellow.

Concerning the composition quoted above, a personal note was added by the critic teacher, which reads as follows:

I can endorse this pupil's statement regarding Mr. S. . . .'s work. I think it expresses in a fine way the class attitude towards his work and interest. I suggest that this be given to Mr. S. . . . to be used as a reference. It should be one to be considered.

The composition quoted below was written by a twelfth-grade pupil in English. Of this student teacher every pupil in a class of twenty-six wrote a composition considered by each of the judges as revealing a favorable attitude. (See Table 23, Miss D. . . . (English 12A) ninth row from the top.)

Of all the practice teachers I have had in school, I believe the teacher I had in this class was my favorite. She always seemed courteous and considerate. She always knew all of her subject and presented it to us in an understanding way. Occasionally she showed slight favoritism, but on the whole she was very fair. However, her teaching ability and knowledge alone was not all that made her the ideal student teacher. Her personality and charm added a great deal to her teaching success. On the last day of her teaching experience with us, we as an apprentice class, gave her a fruit shower.

Compositions expressing a neutral attitude. The compositions placed in this category were difficult to classify. Nearly all of them contained conflicting statements making it very difficult to decide what the writer's true attitude was. The pupil writing the first composition quoted below has a somewhat favorable attitude towards the student teacher but an unfavorable one towards student teachers in general.

In general Mr. C. . . . was a good teacher. He allowed too much disturbance while he was talking. He was not as good as

most teachers are, but from my experience I would say that no practice teachers are. Practice teachers as a whole are a great nuisance as well as a hindrance to learning. Mr. C. . . ., however, is less so than most.

The following statement from a ninth-grade pupil in arithmetic seems to express an unfavorable attitude towards the student teacher because of poor discipline; yet in other respects the pupil liked him.

I like Mr. C. . . . because he has a real interest in arithmetic. Another reason why I like him is because he is always ready to help you if you need help. But there is one thing I don't seem to understand. If I were the teacher, there are a couple of boys in here I would make behave. I think he is too easy with *them*.

The following composition from an eleventh-grade pupil in American history, like the first composition in this category, expresses a rather favorable attitude towards the particular student teacher but an unfavorable attitude toward them in general. The interesting reason is given that the training period is too short.

I do not agree with having student teachers in high school at all, because by the time you get used to them, it is time to change. I did like this particular one fairly well. He seemed interested in his subject and knew it well. Sometimes the class period seemed a little boresome, but not often. I think that he will make a very good teacher.

Compositions expressing an unfavorable attitude. The compositions placed in this category expressed an unfavorable attitude towards the student teacher. The following composition by a tenth-grade English pupil emphasizes a dislike for the methods of teaching used by this student teacher.

This particular teacher did not interest me at all. She did not talk loudly enough for one thing, and for another she talked too much in a monotone. When she wrote on the board, she wrote so lightly that her writing was hard to see. She seemed to have difficulty in formulating definite questions, and we had trouble in trying to decide what she wanted us to answer. Her ideas seemed very emphatic, but, as far as I could see, we seldom came to definite conclusions in discussions. When she asked questions in tests, she took several points off on those questions concerning which we did not think as she did.

Many of the compositions indicated an unfavorable attitude toward the student teacher because of favoritism toward certain pupils and dislike of others. The following composition illustrates this point and also presents an interesting detail concerning personal

appearance. This composition was written by a twelfth-grade pupil in an English class.

I did not like the student teacher because she sometimes was partial. There was one boy in the class whom she must not have liked at all. She always talked in a mean manner to him. Another thing I did not like about her was her personal appearance—particularly the appearance of her shoes. Her dresses and suits were always very clean and neat, but usually she wore dirty, broken down shoes.

It is apparent from the composition presented below that the student teacher's interest in the subject alone gives no certain assurance that he will be liked. Clear methods of presentation, the use of good English, and tact in controlling the pupils are more important in this pupil's opinion. This pupil was a senior in a civics class.

I did not like the student teacher in this class because his presentation was very indefinite. He seemed to start out saying one thing and end up contradicting himself—or else he would just stop in the middle of a sentence, not leaving any definite impression. It was all very involved, and he never seemed to get anywhere.

His grammar was very bad. He would say for instance "they was" and "you was". He also mispronounced words—one very bad example being "controversies". He placed the accent on the second syllable, as, "contro'versies".

He seemed to "pick" on various pupils in the class, once they had caused a disturbance.

Although a classroom is not meant to be a constant playground, this man didn't seem to think about anything but just civics. He didn't seem to have any outside interests and was very unsympathetic toward the pupils. At times he made us feel that he thought *all* we had to study was civics.

I think that this man is interested in civics, but I do not think he has the ability to teach it.

RESULTS OF THE ANALYSIS OF WRITTEN COMPOSITIONS

The results of the analysis of the pupils' compositions are shown in Table 23 as a summary of the number and percentage of compositions per student teacher which each judge classified as favorable, neutral, or unfavorable. The judges are designated as R., B., and G. The letter R indicates the judgment of the present writer, who also was the University supervisor of student teaching; B, the other University supervisor whom the writer asked to read and analyze the compositions; and G, the critic teacher who was also asked to do the same task. The asterisks in the columns headed by the letter G indi-

TABLE 23

ANALYSIS OF WRITTEN COMMENTS MADE BY PUPILS CONCERNING STUDENT TEACHERS

Teachers and Subject	Number						Favorable			Percentage Favorable			Neutral			Percentage Neutral			Unfavorable			Percentage Unfavorable		
	R		B		G		R	B	G	R	B	G	R	B	G	R	B	G	R	B	G	R	B	G
	27	27	27	23	24	24	85.2	88.9	88.9	2	1	1	7.4	3.7	3.7	2	2	2	7.4	7.4	7.4	7.4	7.4	7.4
Judges	27	27	27	23	24	24	85.2	88.9	88.9	2	1	1	7.4	3.7	3.7	2	2	2	7.4	7.4	7.4	7.4	7.4	7.4
Miss C (Eng. 9B).....	26	25	26	24	25	26	92.3	100.0	100.0	1	0	0	3.8	0.0	0.0	1	0	0	3.8	0.0	0.0	3.8	0.0	0.0
Miss S (Eng. 9A).....	17	19	19	15	19	19	88.2	100.0	100.0	2	0	0	11.8	0.0	0.0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Miss D (Eng. 10A).....	25	25	25	10	10	10	40.0	40.0	40.0	6	8	6	24.0	32.0	24.0	9	7	9	36.0	28.0	36.0	36.0	36.0	36.0
Miss H (Eng. 10A).....	33	33	34	11	11	9	34.0	34.0	26.5	8	8	10	24.0	24.0	29.4	14	14	15	42.0	42.0	44.1	44.1	44.1	44.1
Mr. C (Eng. 11B).....	22	22	22	21	21	21	95.5	95.5	95.5	1	1	1	4.5	4.5	4.5	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Mr. P (Eng. 11A).....	22	22	22	18	19	18	81.8	86.4	81.8	4	3	4	18.2	13.6	18.2	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Mr. H (Eng. 11A).....	19	19	19*	15	15	14*	79.0	79.0	73.7*	4	4	3*	21.0	21.0	15.8*	0	0	2*	0.0	0.0	0.0	0.0	0.0	0.0
Miss C (Eng. 12A).....	26	26	26	26	26	26	100.0	100.0	100.0	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Miss D (Eng. 12A).....	29	29	28*	25	25	24*	86.2	86.2	85.7	2	2	2*	6.9	6.9	7.1*	2	2	2	6.9	6.9	7.1*	7.1*	7.1*	7.1*
Mr. H (Hist. 11B).....	24	24	24	23	24	23	95.8	100.0	95.8	1	0	1	4.2	0.0	4.2	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Mr. H (Hist. 11A).....	24	24	24	15	15	18	62.5	62.5	75.0	8	7	5	33.3	29.2	20.8	1	2	1	4.2	8.3	4.2	4.2	4.2	4.2
Mr. D (Hist. 11A).....	30	30	30*	23	23	22*	76.6	76.6	73.3*	3	3	4*	10.0	10.0	13.3*	4	4	4*	13.3	13.3	13.3*	13.3*	13.3*	13.3*
Miss M (Hist. 11A).....	31	31	30*	16	17	14*	51.6	54.8	46.7*	8	8	4*	25.8	25.8	13.3*	7	6	12*	22.6	19.3	40.0*	40.0*	40.0*	40.0*
Mr. M (Civ. 12A).....	25	25	25*	24	24	24*	96.0	96.0	96.0*	1	1	1*	4.0	4.0	4.0*	0	0	0*	0.0	0.0	0.0*	0.0*	0.0*	0.0*
Mr. C (Arith. 9A).....	25	25	25	17	17	17	68.0	68.0	68.0	5	4	4	20.0	16.0	16.0	3	4	4	12.0	16.0	16.0	16.0	16.0	16.0
Mr. A (Arith. 9A).....	23	23	22*	19	19	17*	82.6	83.0	77.3*	3	3	4*	13.0	13.0	18.2*	1	1	1*	4.3	4.3	4.3	4.3	4.3	4.3
Mr. B (Arith. 9A).....	29	29	29*	19	19	17*	65.5	65.5	58.6*	8	8	8*	27.6	27.6	27.6*	2	2	4*	6.9	6.9	13.8*	13.8*	13.8*	13.8*
Miss M (Alg. 9A).....	8	8	8*	8	8	8	100.0	100.0	100.0*	0	0	0*	0.0	0.0	0.0*	0	0	0	0.0	0.0	0.0*	0.0*	0.0*	0.0*
Mr. D (Alg. 11B).....	24	22	22	22	20	20	92.0	90.9	90.9	2	2	2	8.0	9.1	9.1	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Mr. D (Geom. 10B).....	24	24	24	23	24	24	96.0	100.0	100.0	1	0	0	4.0	0.0	0.0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Mr. G (Chem. 12A).....	17	16	17	16	15	16	94.1	93.8	94.1	1	1	1	5.9	6.3	5.9	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Mr. S (Biol.).....	530	528	528	413	420	411	80.1	80.8	80.4	71	64	61	12.6	12.4	10.7	46	44	56	7.3	6.9	6.9	6.9	6.9	6.9
Total																								
Av.																								

* Judged by a fourth judge.

date that the analysis was made not by G but by the fourth judge, the child psychologist.

Examination of the detailed judgments for each teacher reveals the similarities and differences among the judges. Thus, for example, for the 27 compositions about the first student teacher, Miss C (Eng. 9B), R decided that 23, or 85.2 per cent, of the compositions indicated a favorable attitude, and B and G agreed that 24, or 88.9 per cent, were favorable. For the second student teacher, Miss S (Eng. 9A), it was R's judgment that 92.3 per cent of the compositions were favorable, 3.8 per cent neutral, and 3.8 per cent unfavorable. On the other hand, B and G agree that all the compositions indicate a favorable attitude. It will also be noticed that for this entry B indicated that he read only 25 of the compositions, whereas the other two judges read 26. In several other cases the numbers vary slightly because of one of two things: either some of the papers became misplaced, as could easily happen since they were all read independently, or the judge could not make up his mind whether the composition was favorable, neutral, or unfavorable, and therefore omitted it. However, these discrepancies are of minor importance, since they affect the percentages but very little.

That the judges on the whole agreed very closely on the attitude of the pupil toward the student teacher may be seen by observing the figures in the row marked "Average" at the bottom of Table 23. The judges agree that about 80 per cent of the compositions indicate that the pupils have a favorable attitude toward supervised student teachers. In the judgment of R, 80.1 per cent are favorable, 12.6 per cent are neutral, and 7.3 per cent unfavorable. B concludes that 80.8 are favorable, 12.4 per cent are neutral, and 6.9 per cent are unfavorable, and G's opinion (including that of the fourth judge) is that 80.4 are favorable, 10.7 per cent neutral, and 8.9 per cent unfavorable. The correlation coefficient by the rank-difference method was obtained between R and each of the other judges. It was found that the correlation between R and B in respect to pupils having a favorable attitude was .95 and between R and G, .94. The correlation in regard to unfavorable attitudes was .99 between R and B and .92 between R and G. For neutral attitude the correlation between R and B was .80 and between R and G, .91. The relatively high degree of correlation between each of the two judges, B and G, and R is indicative that the results obtained by the author were valid.¹⁰ Assuming that the pupils have revealed their true attitude

¹⁰ "There seems to be a sort of rough agreement among workers in this field that when r is $+70$ to $+100$ correlation is high." William A. McCall. *How to Measure in Education*, pp. 392-393. Chicago: The Macmillan Co., 1929.

by what they said in their essays, then we may conclude that 80 per cent (average 80.4) of the high-school pupils are favorable toward student teachers. Likewise, about 12 per cent (average 11.9) are neutral, or, more strictly speaking, neither altogether favorable nor unfavorable, and less than 8 per cent (average 7.7) are definitely unfavorable.

FURTHER ANALYSIS OF PUPIL COMPOSITIONS

As the compositions were read, it was a relatively simple matter to list the statement that seemed to convey a favorable, unfavorable, or neutral attitude. The 530 compositions yielded for the author 1,871 favorable and 414 unfavorable attitude statements. In other words, there were four and one-half times as many favorable as unfavorable statements. These statements were then telescoped into more comprehensive headings, which seemed to include the meaning of a number of attitude statements. Thus, statements to the effect that the student teacher was likable, speaks to pupils outside the classroom, has a sympathetic attitude, is friendly, is easy to talk to, is cheerful, is not bossy, etc., were listed under the caption, "pleasant personality." There resulted from this classification thirty-four major headings, comprehending all the attitude statements that indicated traits or qualities liked by the pupils. Similarly the statements judged to imply an unfavorable attitude were telescoped under twenty-two major headings.

The author's classification of traits liked is presented in Table 24. The frequency of his distribution is also shown, and the order of rank for all judges. A similar distribution of the traits disliked is presented in Table 25.

A casual examination reveals that the pupils were influenced by the Purdue Rating Scale. This scale, it will be recalled, had been administered just before the writing of the compositions. For example, the trait that received the greatest number of attitude statements, "Efficiency in Presenting Material" apparently is the same, or nearly the same concept as "Presentation of Subject Matter" listed in the Purdue Rating Scale.

On the other hand, many original ideas were expressed not comprehended in the scale. Thus, nothing is mentioned in the scale concerning good methods, lessons well planned, sticking to the subject, etc. Other examples of original ideas in the lists made from the pupils' compositions might be mentioned, such as "Effort," including such attitude statements as "tries to do his best," "earnest," "industrious," "hands test papers back promptly," "works hard with pupils,"

TABLE 24

TRAITS IN STUDENT TEACHERS LIKED BY HIGH-SCHOOL PUPILS

	Frequency (Judge R)	(Judge R)	Rank (Judge B)	(Judge G)
1. Efficiency in presenting material Presentation understandable; good methods; sticks to subject; always prepared; lessons well planned; les- sons well taught; explanation clear; gets subject across; forceful; en- thusiastic.	214	1	1	1
2. Dresses neatly Personal appearance.	173	2	2	2
3. Knows the subject Intellectual; good memory; knows something about the subject besides what the book says.	168	3	3	3
4. Pleasant personality Likable; speaks to pupils outside classroom; sympathetic attitude; friendly; easy to talk to; does not get angry at the pupils; cheerful; not bossy.	120	4.5	6.5	5
5. Makes the work enjoyable Keeps up interest in work; intro- duces new ideas; makes pupils like the subject; interesting.	120	4.5	4.5	4
6. Seems to like to teach Takes an interest in the subject; takes an interest in the pupils.	114	6	31.5	14
7. Willing to help the pupil Helps pupil to study; willing to show pupils their mistakes on tests; answers pupils' questions clearly and definitely.	112	7	8	6
8. Impartial No favorites; gives everyone a chance.	111	8	4.5	7
9. Considerate Kind; gives ample time for outside work; assignments are about right; reasonable; human; patient; good judgment; tests are about right.	105	9	7	8
10. Welcomes differences of opinion Broad-minded; encourages discus- sion; ready to hear pupils' points of view; admits mistakes willingly.	82	10	31.5	9
11. Courteous Good manners; polite.	81	11	9	11

TABLE 24—(Continued)

	Frequency (Judge R)	(Judge R)	Rank (Judge B)	(Judge G)
12. Gets along well with pupils Well liked by the pupils; holds the respect of the class; makes pupils feel at ease in class; understands pupils' difficulties; tactful; under- stands pupils; democratic; pupil participation in assignments; good control.	70	12	10	13
13. Sense of humor Not too serious; will laugh with pupils.	66	13	12	12
14. Pupils feel that they have learned . . . Gets results; inspiring; creates a desire to know more about the sub- ject.	64	14	14	17.5
15. Fairness in grading Gives fair tests.	62	15.5	12	10
15. Effort Tries to do his best; earnest; indus- trious; hands test papers back promptly; works hard with pupils; tries to make himself clear.	62	15.5	12	15
17. Poise Calm; always at ease; presence of mind; balance; does not lose his temper; can meet difficulties well; coolheaded.	33	17	15	19
18. Intellectual honesty Does not think that he knows it all; does not mind being corrected; learns with the pupils; not self- confident in everything; normal in class; does not put on a classroom front; does not bluff.	25	18	16	16
19. Attention to individual differences . . . Shows an interest in each pupil.	14	19	17.5	25.5
20. Self-confidence	12	20.5	17.5	22
21. Assignment technique Explains the assignment; makes definite assignments; assignments reasonable; assignments covered each day; work carefully checked.	12	20.5	19.5	17.5
22. Improvement made all along	11	22	19.5	22
23. No annoying mannerisms	8	23.5	31.5	20
24. Speaks clearly Good voice.	8	23.5	21	25.5

TABLE 24—(Continued)

		Frequency		Rank	
		(Judge R)	(Judge R)	(Judge B)	(Judge G)
25.	Good-looking Pretty.	6	25	22.5	24
26.	Young Vivacious.	5	26	22.5	22
27.	Fluent Does not flounder around for a word or phrase.	3	27	27	29.5
28.	Good English	2	29	26	29.5
29.	Alert Wide awake.	2	29	26	29.5
30.	Fine character Is very good morally.	2	29	31.5	29.5
31.	Good oral reader	1	32.5	31.5	27
32.	Uses gestures	1	32.5	31.5	32.5
33.	Good posture	1	32.5	27	32.5
34.	Experience in industry	1	32.5	28	34
Total No. Attitude Statements		1,871		1,646	1,875

TABLE 25

TRAITS IN STUDENT TEACHERS DISLIKED BY HIGH-SCHOOL PUPILS

		Frequency		Rank	
		(Judge R)	(Judge R)	(Judge B)	(Judge G)
1.	Faulty presentation Does not explain clearly; does not put subject across; spends too much time explaining unimportant things; does not explain fully important points; is sometimes led off the subject; does not stick to subject; pupils' minds are left in confused state; poor technique in demonstra- tion experiments; talks too much; does not encourage discussion; tests are too hard; does not state his questions clearly; writing at black- board can be improved.	63	1	1	1
2.	Destroys interest Tiresome; monotonous; does not create an interest in the subject; dull; repeats statements until in- terest is destroyed; makes subject disagreeable; sticks to the book too closely; too much writing to do; mechanical.	49	2	4	2

TABLE 25—(Continued)

	Frequency (Judge R)	(Judge R)	Rank (Judge B)	(Judge G)
3. Voice Poor enunciation; stammering; monotonous; nasal; fades out at the end of sentences; does not talk loudly enough or clearly enough.	40	3	3	3
4. Lacks poise Disconcerted at times; nervous; stage fright; too self-conscious; easily embarrassed.	36	4	2	5
5. Shows favoritism Has pets; calls on just a few in class.	28	5	14	4
6. Too serious Lacks sense of humor; too formal; cannot take a joke.	20	6	14	6
7. Does not understand pupils Irritates the boys; gives tests un- expectedly; takes pupils' study period; lacks tact; harsh; sarcastic; pupils do not know how to take him; confuses names; always ready to send pupil to the office if the pupil just whispers; too strict; does not speak to pupils outside of class.	18	7	6.5	11
8. Lacks self-confidence Has to use an outline; timid; bash- ful; not sure of himself at times.	17	8	5	7.5
9. Annoying mannerisms and habits Looks out of the window at times; left-handed; does not know what to do with his hands; does not stand erect in front of class; seems to be chewing something all the time; habit of putting his hands in his mouth; always plays with a pencil while he talks.	16	9	14	7.5
10. Grades unfairly Too easy in grading; rank ignor- ance in grading; grades lower than the regular teacher's.	14	10	25.5	9
11. Uses different method than regular teacher Would rather have regular teacher; does not get so much out of the course as when the regular teacher teaches; inclined to be unfavorable to all practice teachers; unfavor- able because the regular teacher was liked so well.	13	11	20.5	10
12. Does not know his subject thoroughly Becomes confused in some in- stances.	12	13	16	15.5

TABLE 25—(Continued)

	Frequency (Judge R)	(Judge R)	Rank (Judge B)	(Judge G)
13. Poor control over pupils..... Poor discipline; fails to hold the attention of all the pupils; not care- ful to watch pupils during tests; does not make pupils talk loudly enough.	12	13	10.5	12.5
14. Incorrect English usage..... English needs improvement.	12	13	18.5	14
15. Appearance—dress Always wore the same couple of dresses; hair untidy; lack of neat- ness, particularly in shoes; not clean; dresses in too dashing a style for a school teacher.	11	15.5	6.5	15.5
16. Assignments poorly made..... Not clear; too long; silly ideas.	11	15.5	8	12.5
17. Not enough enthusiasm..... Not enough push; only mildly in- terested in teaching; loses interest in the subject; depressing at times.	9	17	10.5	19.5
18. Displeasing personality Peculiar manner.	7	18	18.5	17
19. Does not take criticism well..... Does not admit his mistakes grace- fully; stubborn; conceited; always right.	6	19	10.5	18
20. Does not answer the pupils' questions clearly Lack of definiteness as to whether pupils' answers are right or wrong.	4	20.5	22	21.5
21. Standards of achievement too low... Tests are too easy; too sympathetic with the pupils; does not make work hard enough; does not check up on assigned work from outside source.	4	20.5	17	23
22. Never says anything kind..... Unsympathetic; makes a person feel "dumb".	3	22.5	20.5	21.5
23. Needs more experience.....	3	22.5	10.5	19.5
24. Not at school long enough each day..	1	25.5	26	26.5
25. Too young	1	25.5	23.5	24.5
26. Not liberal in his viewpoint.....	1	25.5	26	26.5
27. Not serious enough.....	1	25.5	26	24.5
Total No. Attitude Statements	412		329	397

etc. Similar examples might be taken from Table 25, which includes the list of traits disliked by high-school pupils. Take, for example, "Voice" with the subheads, "stammering," "poor enunciation," "nasal," "fades out at the end of sentences," etc. These are original ideas not included in the Purdue Rating Scale. So with almost every trait listed in either category, it is clear that the analysis of the pupil compositions captured ideas essential in the training of teachers not specifically mentioned, at least, and perhaps not even comprehended at all by the scale. The marking of the scale immediately preceding the writing of the compositions served an essential role in stimulating the pupils to do some reflective thinking, which in turn resulted in a list of traits especially valuable in the training of student teachers.

VALIDATION OF THE PRECEDING ANALYSIS

The author's analysis of the pupils' compositions was validated by having the three judges mentioned make a distribution also of the statements. To this end a separate master chart was constructed and given to each judge. The master charts were the same as Tables 24 and 25 except that the names of the student teachers were typed in a horizontal row at the top, and parallel lines were drawn in such a manner that a frequency distribution could be made for each trait. These distributions were then summarized for each judge.¹¹ Each judge worked independently and did not have access to the author's or each other's distributions. The author's method, however, was carefully explained to each judge in the beginning, and several papers were analyzed by him in the presence of each in order to illustrate the procedure used.

It is quite apparent from an examination of the data presented in Tables 24 and 25 that the judges did not agree in every particular in the distribution of attitude statements. It was not expected that they would agree, for the judgments were made on a subjective basis. The remarkable feature is that they agreed as well as they did. However, as Tryon pointed out in the early days of criticism of subjective methods, the agreement between subjective judgments of essay-type examinations is much higher than many students of scientific methods in education profess to believe, provided the standards for judging have been understood previously by all of the judges and agreed upon by them.¹²

¹¹ See Table 46 in the complete study. Ryder, *op. cit.*, pp. 231-236.

¹² Rolla M. Tryon, *The Teaching of History in Junior and Senior High Schools*, pp. 155-156. Boston: Ginn and Co., 1921.

It is apparent, for example, that all the judges were of one mind that more statements expressing approval were made about "Efficiency in Presenting Material" than for any other trait. This trait was ranked first on the basis of frequency by all the judges. Likewise all the judges placed the trait, "Dresses Neatly," as second on the basis of frequency of mention and "Knowledge of the Subject" as third. Most of the traits, as may be observed in the columns labeled "Rank," show rather close agreement among the judges. However, there were differences of opinion. For example, the trait, "Welcomes Differences of Opinion," shows a very wide divergence on the part of one judge, B, from that of the other two. Judge B classified none of the statements under this heading, making it rank 31.5, or last; whereas the author, R, found 82 statements and G found 87, which made it rank ninth in her classification. Approximately the same relationship holds for the trait, "Seems to Like to Teach." Judge B did not think that any of the attitude statements could be classed under this heading, whereas R classified 114 under this heading and G 47. In rank, Judge B's classification places this trait 31.5 from the top and the third judge, G, places it fourteenth. (See Table 24.) Some of the criticisms of the judges are presented below as indications of the difficulties they encountered in making the analysis of the compositions in the first place and in classifying them in the second.

1. No definite place for such statements as,

Not sarcastic

Always smiling

Not superior

Good sport

Nice

Thoughtful

2. Aren't these duplications?

{ Takes an interest in pupils

{ Shows an interest in each pupil

{ Helps pupils to study

{ Works hard with each pupil

{ Doesn't think he knows it all

{ Not self-confident in every way

{ Explanation clear

{ Presentation understandable

{ Tries to make himself clear.

3. The characteristics of "Effort" seem to duplicate "Presentation of Subject." It takes effort to make the latter favorable.

While it must be admitted that these difficulties will appear to any competent appraiser of the compositions, the answer is that the judge must decide from the context in which category the statement belongs. In spite of differences of opinion the judges did agree with the author very well in his classification and distribution of traits. The evidence for this assertion may be determined in a rough way by inspection of the final rankings made from the distribution of traits which the judges returned. It must be kept in mind that the work of each judge was done independently. Further evidence of the concurrence of the subsequent judgments of the other judges with that of the author may be found in the correlation coefficients obtained. For R and the second judge, B, the coefficient of correlation obtained by the rank-difference method was .80, and for R and G the correlation was .96. These correlations were sufficiently high to indicate that the author's classification and distribution of traits were valid, and, therefore, no other revision was undertaken.

LIMITATIONS OF PROCEDURE USED

The principal limitation in the validating procedure used is that the judges distributed the attitude statements within the framework of the original classification of the author. It is possible that, if they had made their own classification as they read the compositions, different headings would have resulted and perhaps even a different list of traits. However, this procedure was not feasible for two reasons: (1) the labor involved would have been more than it would be fair to ask voluntary assistants to do, and (2) it is doubtful if this procedure would have been as good as the one adopted. It is unlikely that it would have been as good for the reason that the validity of subjective evaluations depends upon prearranged and agreed upon standards of judgment. That the judges did exercise freedom of judgment may be noted by examining the total number of attitude statements counted. (See Tables 24 and 25.) It will be noticed that R recognized and classified 1,871 favorable attitude statements, B, 1,646, and G, 1,875. Likewise, there was an unequal number of unfavorable attitude statements noted. The lowest was 329, which is 83 fewer than the author's count.

SIGNIFICANCE OF THE ANALYSIS OF ATTITUDE STATEMENTS

The practical value of the foregoing analysis is that it enables the supervisor to place the emphasis where it is most needed in his training program. If we assume that the ten or fifteen most fre-

quently mentioned traits in either the liked or disliked lists are the most important, then it is easy to put the major attention on these traits in counseling with the student teachers. Furthermore, if the supervisor carries these lists with him on his supervisory visits to student teachers and uses them as he observes them at work, he will find, as the writer has, that they serve very well as check lists for indicating points to be discussed in conferences with individual teachers. The writer has found also that in group conferences with student teachers both lists of traits, but particularly the traits disliked by high-school pupils, elicit intense interest and animated discussion—much more, indeed, than any rating scale used in a similar manner. One reason for this is that since the language of the pupils has been preserved, the traits and procedures disliked or criticized seem much more real and vital than the points listed and checked on commercial rating scales, no matter how authentic or valid their publishers claim them to be.

Perhaps the most significant point in respect to the training of student teachers that the analysis reveals, is that all the judges agree that (1) "Efficiency in Presenting Material," (2) "Neatness in Dress," (3) "Knowledge of the Subject," (4) "Pleasant Personality," and (5) "Ability to Make the Work Enjoyable" are the five most important qualities a student teacher must have as judged from the frequency of mention by high-school pupils. (See Table 24.) If one may be permitted to judge importance from frequency of mention, it is clear that high-school pupils consider efficiency in presentation, including such concepts as the use of good methods, sticking to the subject, well-planned lessons, clear explanation, and an understandable, forceful, and enthusiastic presentation as more important than evidence of scholarship or knowledge of the subject. According to the writer's judgment the latter has 46 fewer favorable attitude statements made about it than does presentation of the subject. One judge counted 37 fewer statements, and the third judge found 78 fewer.

That neatness in dress and a well-groomed personal appearance should rank so high on the basis of frequency of mention among the traits liked is not surprising. The same type of evidence appeared from the analysis of the pupil ratings of student teachers on the Purdue Rating Scale. (See Figure 6.) It would seem, therefore, that high-school pupils attach great importance to this trait. It may well be, however, that the factors that constitute this trait are better known to high-school pupils than some of the others. The relatively large number of attitude statements dealing with neatness of dress

and personal appearance may therefore be indicative of immaturity of judgment.¹³ Be that as it may, the fact is that since neatness in dress and a well-groomed appearance are so much noticed and approved by high-school pupils, it behooves supervisors to make certain that proper attention is given to improving this trait with all student teachers in need of suggestions. It should not be shunned or dodged merely because it is a personal trait.

In many respects the major reasons given by high-school pupils for not liking teachers are the antithesis of those given by pupils who like them. For example, faulty presentation or poor methods used in teaching is the trait most disliked, whereas good methods of teaching or efficiency in the presentation of material is the quality most liked. Similarly, attitude statements characterized by such words and phrases as "tiresome," "monotonous," "dull," "mechanical," "repeats a statement until interest is destroyed," "sticks to the book too closely," etc., which may be classified as destroying interest, are frequently mentioned. This quality has second place among those most disliked according to two of the judges, and fourth according to the third. Its opposite, the quality of making the work enjoyable, is high in the list among the traits liked, having a rank of 4.5 according to two of the judges and 4 according to the third. (See Table 24.) Similarly, many other definite contrasts may be shown; "shows favoritism," characterized by statements to the effect that the student teacher has pets or calls on just a few in the class, may be contrasted with "impartial," characterized by statements that the student teacher has no favorites and gives everyone a chance. Both of these traits rank high in their respective lists. (See Tables 24 and 25.)

The analysis of attitude statements is significant also in the supervision of individual student teachers. If the pupils are asked to write the compositions early enough in the course so that they may be read and analyzed in time to give the student teacher the benefit of the findings, no doubt salutary results would follow. Individual student teachers may be compared in the various traits. Take, for example, the trait of "Willing to help the pupil." According to R's judgment, the range is from no statements at all in regard to this trait for Mr. C's class in Arithmetic 9A to 13 for Miss S's class in English 9A. It would seem from this evidence that Mr. C is seriously lacking in a trait essential to success in teaching.¹⁴ He is in need of supervision

¹³ H. H. Remmers found that this trait was ranked ninth in importance by college students. Remmers, *op. cit.*, p. 19.

¹⁴ Tryon, *op. cit.*, p. 254.

to develop techniques and professional habits in this form of behavior. Miss S, on the other hand, seems to be lacking in a sense of humor, since none of the judges found any reference to this trait. Mr. C, however, seems to possess the trait since all the judges indicate that they found attitude statements having reference to this trait. Comparisons for each of the traits could be made on the percentage basis. By dividing the number of attitude statements made for any given trait by the total number found for each student teacher, the percentage of favorable attitude statements for each trait may be obtained for each student teacher.

Even more valuable aid might be given student teachers by similar analysis of traits disliked. Take for example the trait "Voice". In the complete study it is shown that the judges agreed that for Miss C in English 12A the pupils mentioned rather frequently the unsatisfactory quality of her voice. Thus, for the 21 attitude statements made indicating criticism of one kind or another, 5, or nearly 24 per cent, according to R's judgment, referred to the unsatisfactory quality of her voice. According to B's judgment 21 percent of the attitude statements, or about 23 percent of the criticisms, referred to her voice. On the other hand, all the judges agree that there are no criticisms of voice for Miss M in Algebra 9A, Mr. M in Civics 12A, Miss S in English 9A, Miss C in English 9B, Mr. G in Chemistry 12A, Miss D in English 10A, Mr. P in English 11A, Mr. C in Arithmetic 9A, and Mr. A in Arithmetic 9A.¹⁵ The quality of voice of these teachers is apparently quite satisfactory and is in need of little or no attention from the supervisor. In similar manner any other trait disliked by high-school pupils could be analyzed. A table of this kind made for any group of student teachers would help the supervisor to diagnose their difficulties. It also suggests where the emphasis in supervision should be placed for each student teacher.

SUMMARY

In this chapter two major facts were shown. First, a statistically significant gain was made by the student teachers in qualities known to be associated with success in teaching between the end of the first week and the end of the last week of student teaching. The measuring instrument was the Purdue Rating Scale, which purports to measure the pupils' attitude toward their instructors through obtaining their reactions upon ten professional and personal traits. In terms of the pupils' attitude towards student teachers the evidence

¹⁵ Ryder, *op. cit.*, p. 238.

indicates that, under the type of supervision provided, high-school pupils regard student teachers as better instructors at the end of the training period than at the beginning. The attainment of this goal is sufficient justification for administering the course. It is a matter of importance to discover also that the greatest improvement in the pupils' opinion was made upon three of the most important traits in the list, namely, presentation of subject matter, stimulating intellectual curiosity, and self-reliance and confidence.

The second point discussed in this chapter was based upon the discovery that eighty per cent of the pupils have a favorable attitude towards student teachers and that less than ten per cent are definitely unfavorable in their attitude towards them.

By using the technique of asking the pupils to write a composition upon the theme "Why I Liked the Student Teacher I Had This Semester," or "Why I Did Not Like the Student Teacher I Had This Semester," attitude statements were counted and classified under each of these categories. It was found that over four times as many attitude statements were made as to why student teachers were liked than were made as to why they were not liked. These tabulations were verified in the main by three other competent judges.

Further analysis of the compositions gave a list of traits liked and a list of traits disliked in student teachers by high-school pupils. These lists have been found to be helpful in supervising student teachers.

CHAPTER VII

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The experiment described in the foregoing pages deals with two phases of evaluating the efficiency of supervised student teachers in two co-operating high schools. The two high schools were the Lafayette, Indiana, (Jefferson) High School, and the West Lafayette, Indiana, High School, both serving Purdue University as co-operating training centers for student teachers. The two phases of the work evaluated consisted of the following activities:

1. Measuring the relative achievement of high-school pupils taught by supervised student teachers, and
2. Measuring the effects of student teaching upon the pupils' attitude towards the subjects taught and towards the student teachers themselves.

After the measurements were taken, the results were evaluated for their statistical significance. Also, other forms of evaluation were made, such as the analysis of compositions written by high-school pupils and the analysis of the records pertaining to intelligence, scholarship, and personality of the most successful and least successful student teachers.

The experiment relating to achievement consisted in administering objective subject-matter tests to all pupils taught by supervised student teachers at the beginning of their supervised student teaching experience and then repeating the same tests at the end of this experience. This was a period of seven weeks with the student teacher teaching for a full period each day in the presence of the critic teacher. In order to have a basis for comparison, the tests were given at the same time to all classes in the same subjects taught by the regular high-school teachers. The tests used were high-school tests covering the subjects taught, prepared semi-annually by the Indiana State High-School Testing Committee. Approximately 3,000 pupils were tested initially—1,497 of whom were pupils taught by supervised student teachers. After the pupils were given the initial tests and the papers were scored, the raw scores were converted into T-scores. The T-scores and the Otis I. Q. were then used for matching pupils in the same subjects who were taught by the regular high-school teachers. Only the pupils who were matched or paired were

considered in the experiment. The final scores of the matched pupils were then averaged and the differences in the mean scores were evaluated for their statistical significance.

The data were studied in four ways:

1. In gross findings between the experimental and control pupils. The pupils were considered in two large groups—the former taught by all of the student teachers and the latter by the regular high-school teachers.
2. They were considered separately for each of the five semesters the experiment was in progress.
3. They were compared for each of the subject-matter areas, viz., English, American history, world history, civics and economics, algebra, arithmetic, chemistry, biology, and plane geometry.
4. They were compared for each student teacher. By treating the data in this way a check was obtained on the results previously found. Moreover, it was possible by this means to identify the student teachers who were most successful from those who were least successful and to determine some of the causes for success or failure.

RESULTS IN RESPECT TO ACHIEVEMENT

The results of the study in terms of the achievement of high-school pupils under supervised student teachers' instruction are as follows:

1. The difference in achievement between the entire group of pupils taught by supervised student teachers was very small. It was not statistically significant. The small obtained difference was in favor of the group taught by supervised student teachers.
2. The pupils in the lowest fourth in initial achievement did better work under supervised student teachers than under the regular teachers. The difference was statistically significant. This result is of importance, for it indicates that slow learners or pupils who are not up to the average are benefited by having student teachers assigned to assist the regular teacher. This result was explained as due to the type of supervision, which stressed the adapting of instruction to individual differences and insisting that the critic teacher stay in the classroom with the student teacher.

3. Pupils in the highest fourth in initial achievement learned just as much under supervised student teachers as they did under the regular teachers. The obtained difference on the final achievement tests was in favor of the group taught by supervised student teachers. This difference was not significant, but it was larger than for the group as a whole. The type of supervision which emphasized instruction adapted to the ability of the individuals in the class was held to be responsible for the creditable showing of pupils in the highest as well as in the lowest fourth. Much of this work with individuals was made possible by the fact that there were in effect two teachers—the critic teacher and the student teacher—to do it. The unsupervised regular classroom teacher often fails to give extra time for individual instruction to pupils who have difficulty with the subject and much less time in enriching the course for the brilliant student.

4. Measurements were taken separately for each of the five semesters the experiment was in progress. The results showed that in no semester was a difference obtained between the two groups as high as the 1 per cent level. For two of the semesters the student teachers' pupils were ahead in final achievement, and for three of the semesters the regular teachers' pupils were ahead. In two semesters the differences were significant at the 5 per cent level. One of these was in favor of the student teachers and the other in favor of the regular teachers. These results indicate that, semester after semester, under the same type of supervision pupils learn just as much under supervised student teachers as they do under the regular high-school teachers.

5. Measurements were also made separately for each of the several high-school subjects taught. In only two subjects was a statistically significant difference in achievement obtained. These were algebra and arithmetic. The difference in algebra was in favor of the group of pupils taught by supervised student teachers, and in arithmetic it was in favor of the regular teachers. The superior work of the student teachers in algebra was attributed to the fact that students obtaining a license in mathematics at Purdue University are usually excellent in mathematics themselves, and, second, algebra is a study which lends itself quite readily to individual instruction. Various reasons were suggested for the inferior work in arithmetic.

In all other subjects, English, American history, world history, social studies, plane geometry, chemistry, and biology, the differences were not statistically significant—a fact that indicates that

the pupils taught by supervised student teachers learned just as much and as well as under the regular high-school teachers themselves. In general, the small differences obtained favored the pupils taught by the supervised student teachers in the technical subjects and the regular high-school teachers' pupils in the non-technical subjects, such as English, history, and social studies. This is probably due to the fact that Purdue University is a technical institution where stress is laid upon science and mathematics.

6. Measurements were also taken for each student teacher. The results verified the findings enumerated above in respect to gross findings. For fifty-two of the sixty-seven student teachers employed in the experiment, the difference in achievement between their pupils and paired pupils from other sections of the same class group taught by the regular teachers was not statistically significant. In other words, for the great majority of supervised student teachers there was no difference, except what might be accounted for by chance, between the achievement of their pupils and pupils taught by the regular high-school teachers. For seven of the student teachers statistically significant differences were found in favor of the pupils taught by them. For eight of the student teachers statistically significant differences were found in favor of the matched groups taught by the regular high-school teachers.

7. The seven student teachers who did significantly better work than the regular teachers were contrasted in various ways with the eight student teachers whose pupils got significantly poorer results than matched pupils taught by the regular teachers. These comparisons were grouped under (1) scholarship, (2) professional interest in teaching, and (3) personality.

(1) *General intelligence and scholarship.* The seven student teachers whose pupils achieved more than pupils taught by the regular teachers were superior in general intelligence and scholarship to the group of student teachers whose pupils achieved less than comparable pupils taught by the regular teachers. They excelled the latter group in general intelligence as measured by the National Council Psychological Examination, in English as measured by the Purdue Placement Test in English, in mathematics as measured by the Iowa Mathematics Training Test, and in general scholarship as determined by their scholastic index converted into percentile ranks.

All these records were obtained from the office of the registrar of Purdue University.

(2) *Professional interest in teaching.* Professional interest in teaching was found to be higher or better for the group of student teachers whose pupils achieved superior results. Three lines of evidence supported this conclusion. First, 85 per cent of the most successful student teachers entered the teaching profession as contrasted with 50 per cent of the least successful group. Second, the most successful group of student teachers received higher marks in two of the most professionalized courses for teachers in the University, namely, Supervised Student Teaching and Methods in Teaching High School Subjects, than did the least successful group. The average mark of the former was one grade point higher than the latter—or the difference between A+ and B+. Third, in the traits enumerated on the Purdue Rating Scale, which covers professional qualities such as interest in subject, fairness in grading, and presentation of subject matter, the pupils' rated the most successful group of student teachers much higher on the average than they did the least successful group.

(3) *Personality.* In personality also the most successful group of student teachers was superior to the least successful. As determined by pupil ratings on the Purdue Rating Scale, the seven most successful student teachers exceeded the least successful group in each of the ten traits listed on the scale. The greatest difference was found in personal peculiarities. The least successful group of student teachers had in the students' opinion a greater number of objectionable personal peculiarities than the most successful group. The group of student teachers whose pupils achieved the largest amount of success were ranked higher by substantial margins in other personal traits such as (1) sympathetic attitude, (2) liberal and progressive attitude, (3) sense of proportion and humor, (4) self-reliance and confidence, and (5) personal appearance, than the student teachers whose pupils made the least success.

It was found, further, by comparing results obtained from the Bernreuter Personality Inventory, that the student teachers who were most successful had, on the average, personality patterns more like that of average college students than did the least successful group. The latter deviated more from the average in personality traits than did the former. The

greatest difference was in dominance-submission. The personality inventory indicated that the least successful student teachers were more dominant in face-to-face situations than the more successful ones. They were therefore probably less inclined to follow the instruction and advice of their supervisors willingly than were the more successful student teachers. Moreover, this personality trait might, in a teaching situation, easily take the form of bossiness, a domineering, over-bearing attitude, lack of openmindedness and sweet reasonableness.

The student teachers who deviated most widely from the mean for college students in personality were two men. One was the least successful student teacher and the other the most successful. The latter failed, however, as a regular teacher in the sense that he was not given a second year's contract by the school board who employed him. Both of these men were brilliant students—both introverts. The fact that they both failed—one as a student teacher and the other as a regular teacher—indicates that a well-adjusted or balanced personality is just as important for success in teaching as good scholarship.

RESULTS IN RESPECT TO ATTITUDE

The results in respect to the pupils' attitude towards the subjects taught by student teachers are as follows:

1. High-school pupils' attitude towards the subjects taught by student teachers is probably just as good as when the subjects are taught by the regular teachers. None of the obtained differences was statistically significant. For all subjects except algebra the obtained differences were in favor of the regular teachers. In algebra the obtained difference was in favor of the pupils taught by student teachers, but again the difference was not statistically significant. Since the difference obtained may have been due to chance, the conclusion that pupils think just as much of, or have just as high regard for, a subject when it is taught by supervised student teachers as when it is taught by regular teachers is probably sound. Further experimentation on this point is desirable for the reason that the data employed in this study do not support a definite conclusion.
2. The pupils' attitude towards the subject taught improved slightly between the time when the student teachers began their

work as supervised teachers and when they finished. The same relationship held for the regular teachers—a condition indicative of good morale. The two exceptions in improvement in attitude were in English and biology for student teachers' classes, but the losses were statistically insignificant.

The following results were found in respect to the pupils' attitude toward student teachers :

1. High-school pupils have a better attitude toward regular teachers than toward student teachers. The difference was statistically significant at the beginning of the teacher-training period and at the end.

2. Great improvement, however, occurred in the pupils' attitude toward student teachers between the first and last weeks of student teaching. The last rating was higher by a statistically significant difference than the first. This indicates that the pupils think more highly of student teachers as the latter acquire experience.

3. High-school pupils evaluate student teachers higher in traits dealing with success in teaching at the end of seven weeks than in the beginning. In the pupils' opinion the greatest gain is made on the three most important traits in the Purdue Rating Scale, namely, presentation of subject matter, stimulating intellectual curiosity, self-reliance and confidence. The important personality trait, sense of proportion and humor, also increases significantly in the pupils' opinion between the first and last lesson. These gains are gratifying to the supervisor because they prove that the more important objectives of the course are being achieved.

4. Analysis of pupils' compositions on whether they liked their student teacher and why showed that eighty per cent of the high-school pupils in Jefferson High School and the West Lafayette High School have a favorable attitude toward student teachers. Only seven per cent are definitely unfavorable; and the rest, or approximately thirteen per cent, are neutral or indifferent in their attitude toward them.

5. Further analysis of the compositions produced a list of traits most liked and most disliked in student teachers. The five most liked traits are :

- (1) Efficiency in presenting material
- (2) Neatness in dress
- (3) Knowledge of the subject
- (4) Pleasant personality
- (5) Ability to make the work enjoyable

The five most disliked qualities are:

- (1) Poor presentation of the subject
- (2) Quality of destroying interest
- (3) Poor quality of voice
- (4) Lack of poise
- (5) Showing favoritism

Over four and one-half times as many favorable attitude statements were made in the pupils' compositions as unfavorable. The lists of favorable and unfavorable attitude statements about student teachers have proved helpful supervisory devices in counseling with other student teachers. The contribution which these lists have to make in supervising student teachers is that in them the language and forms of expression of high-school pupils themselves have been retained.

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER STUDY

The findings listed above contain the conclusions that may be derived from this study. In more comprehensive terms, however, the main conclusions may be stated as follows:

1. High-school pupils learn just as much when taught by supervised student teachers as when taught by the regular teachers. Pupils with less than average ability learn more when a student teacher is assigned to the room. This fact is probably due to the two reasons (1) that the student teaching is done under the close supervision of the University supervisor and the critic teacher, with the latter present in the room practically all the time, and (2) that more attention is given to learning difficulties under the type of supervision provided than when the regular teacher works alone under comparatively unsupervised conditions. Better-than-average, or the brighter, pupils tend to learn more also. It is not the student teacher alone but the conditions under which he works which account for the difference. Instruction is more likely to be adapted to the individual needs and difficulties of the pupils when a student teacher has been assigned to a class under the conditions described in this study than when the regular teacher works alone with little or no classroom supervision.
2. Pupils are not harmed by having student teachers for instructors if the latter are carefully supervised—in fact, they are more likely to be benefited.

3. Pupils have a better attitude towards regular high-school teachers than they have towards student teachers—that is, they like them better than student teachers. However, as the latter gain in experience there is a significant improvement in the pupils' attitude toward them.
4. Bright pupils have on the average about the same attitude toward student teachers as dull pupils.
5. Pupils think no less of school subjects when taught by supervised student teachers than when taught by the regular teachers. There is no evidence to support the view that pupils acquire a strong dislike toward any high-school subject just because they have had a student teacher for an instructor in it.
6. Good student teachers are better liked by their pupils than poor student teachers. Their personality does not diverge so far from the average as the poor. In other words, they are not domineering on the one hand nor egocentric introverts on the other, but are characterized rather by balance, poise, and the absence of extremes in personal qualities.

It is recommended that other studies be conducted along similar lines. The conclusions reported could be further validated by extending this experimental study to include a number of institutions using the same type of supervision. Other desirable studies should include the comparison in achievement and attitude of high-school pupils under unsupervised student teaching. This would throw light on the value of experience. Another interesting experiment would consist of doubling the length of supervised student teaching under similar supervision to that described in order to see what the effect would be upon the pupils. Still another experiment, more difficult but probably more valuable, would be the measurement or evaluation of concomitant learning not measured by objective achievement tests in the subject taught. Those acquired under student teachers should then be enumerated and evaluated as to quality with those acquired under experienced teachers. This is recommended for the reason that superintendents and principals want to know how valuable the factor of experience is for two candidates of, say, equal scholarship, personality, and interest in teaching, one of whom has had several years of experience and the other none save supervised student teaching. A much simpler experiment is to find out how much the student teacher learns about the subject and about teaching from his experience as a supervised student teacher in definitely con-

trolled periods of time. Some or all of these experiments need to be conducted if the various plans and proposals for changes in the education of teachers that appear from time to time are to rest upon scientifically determined facts.

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